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PC WORLD

July 1996

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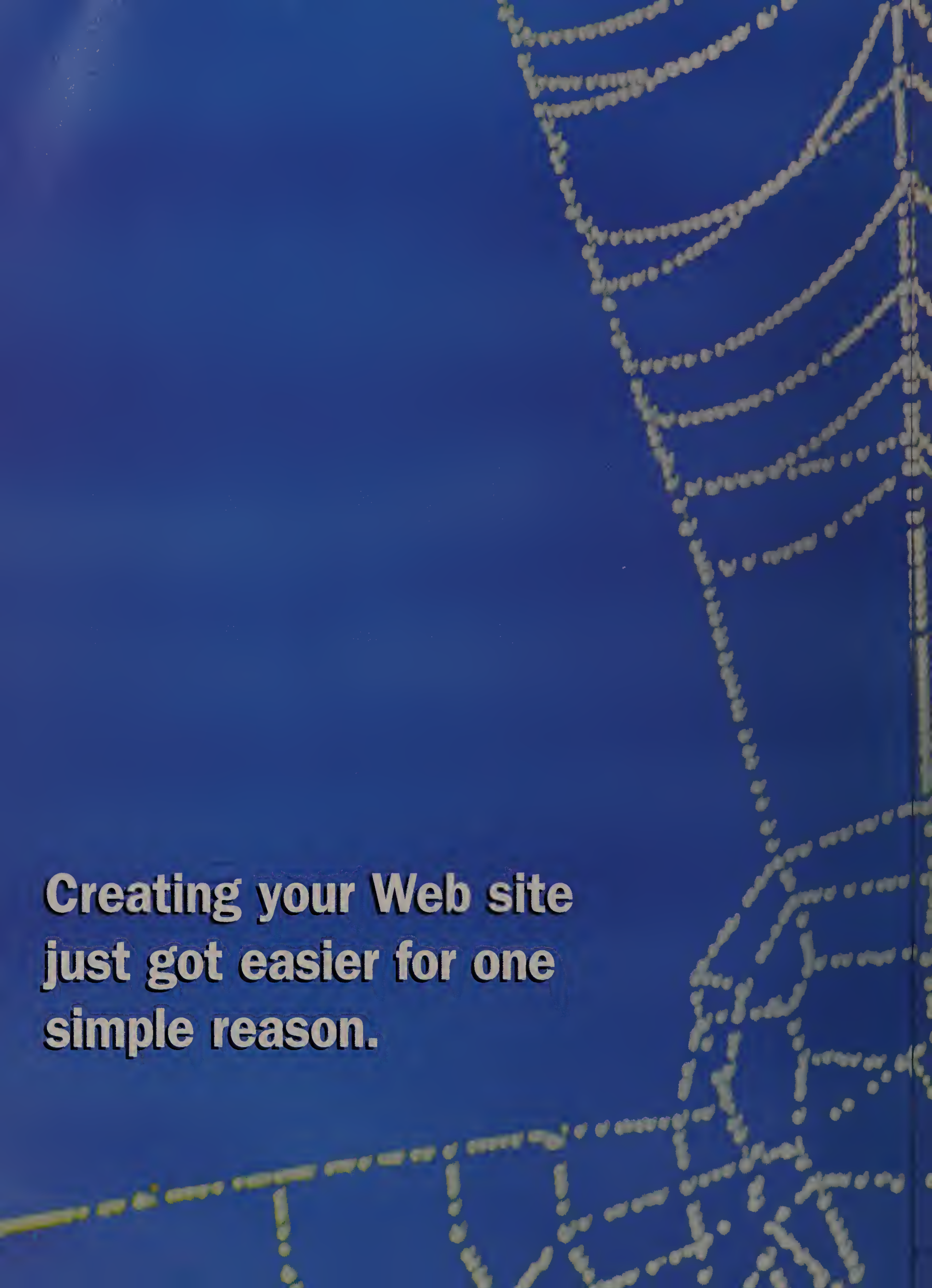
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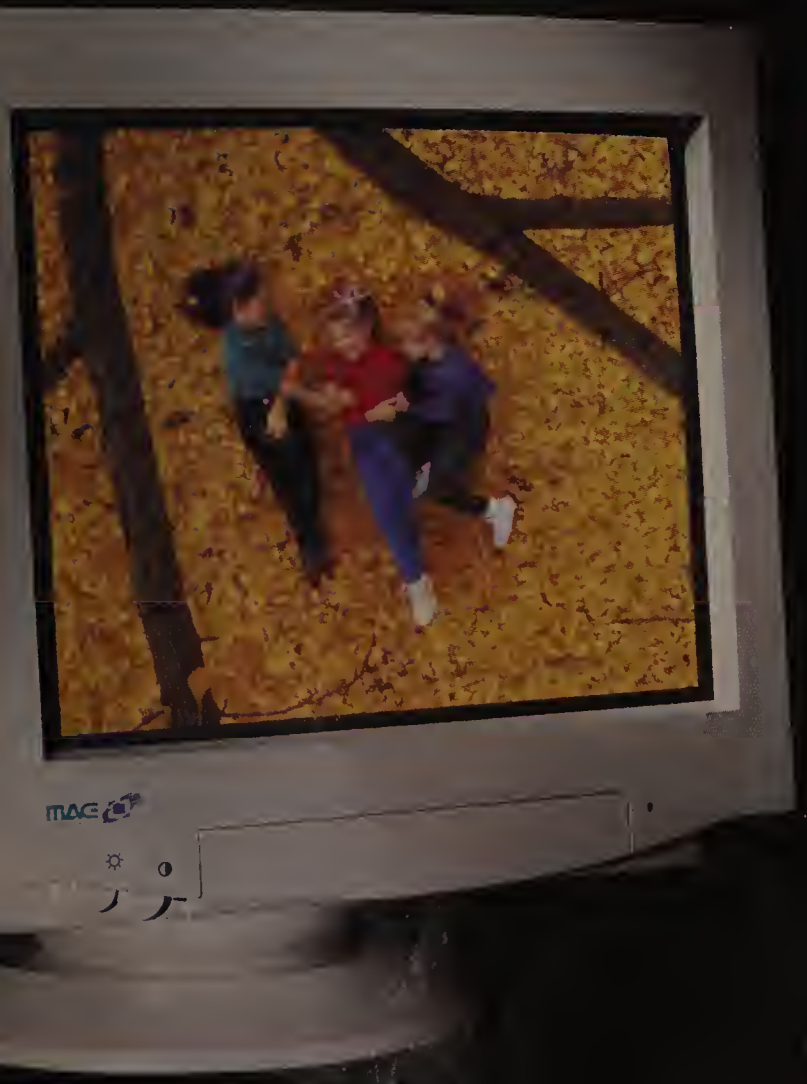

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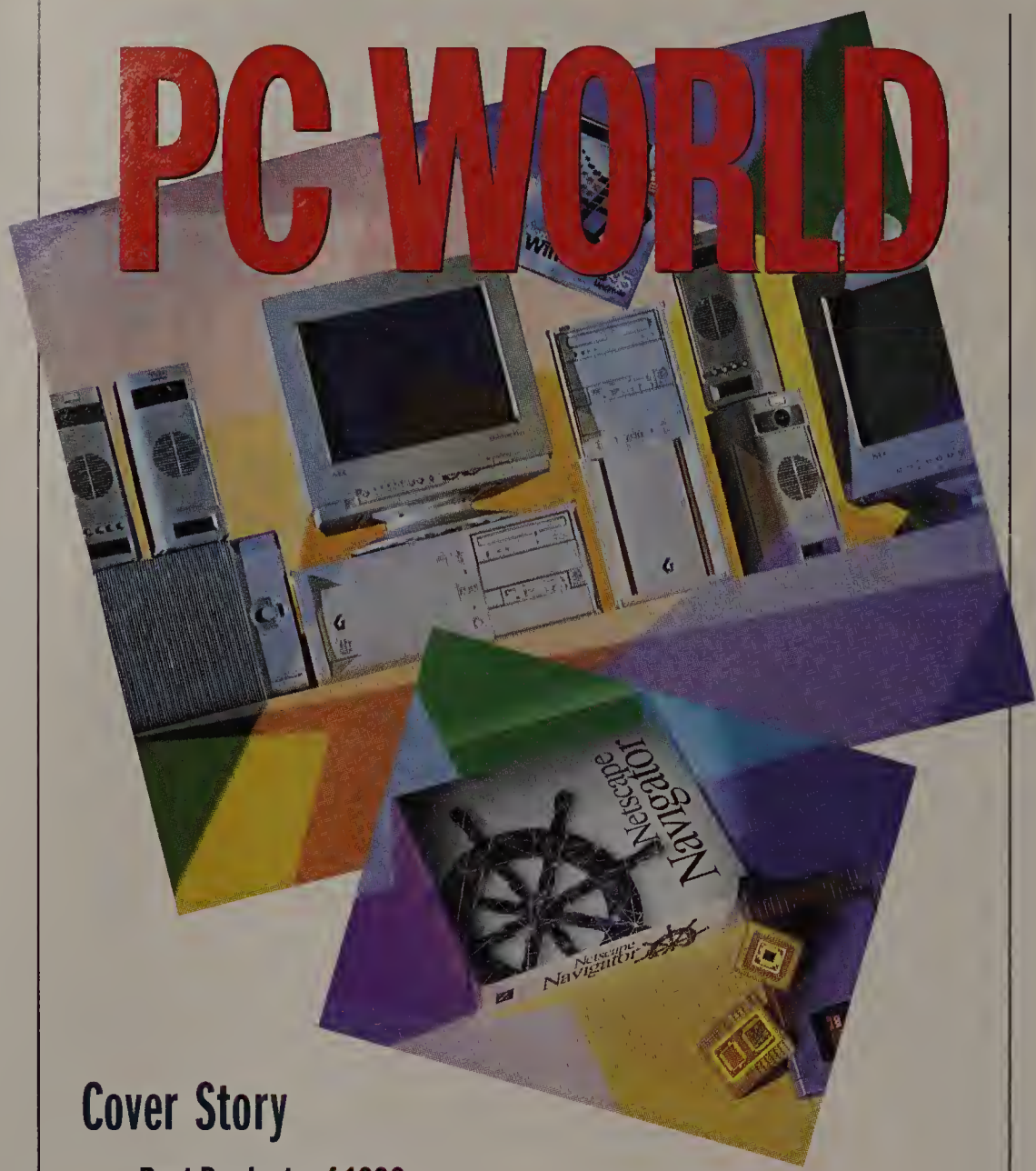

Cover Story

96 Best Products of 1996
For our 14th annual World Class awards, *PC World* asked 2000 experts to vote for the best products of the year. The result: the ultimate buyers guide to outstanding hardware, software, and services. From systems to CD-ROM drives, printers to personal finance software, word processors to Web software, we present our 82 World Class winners.

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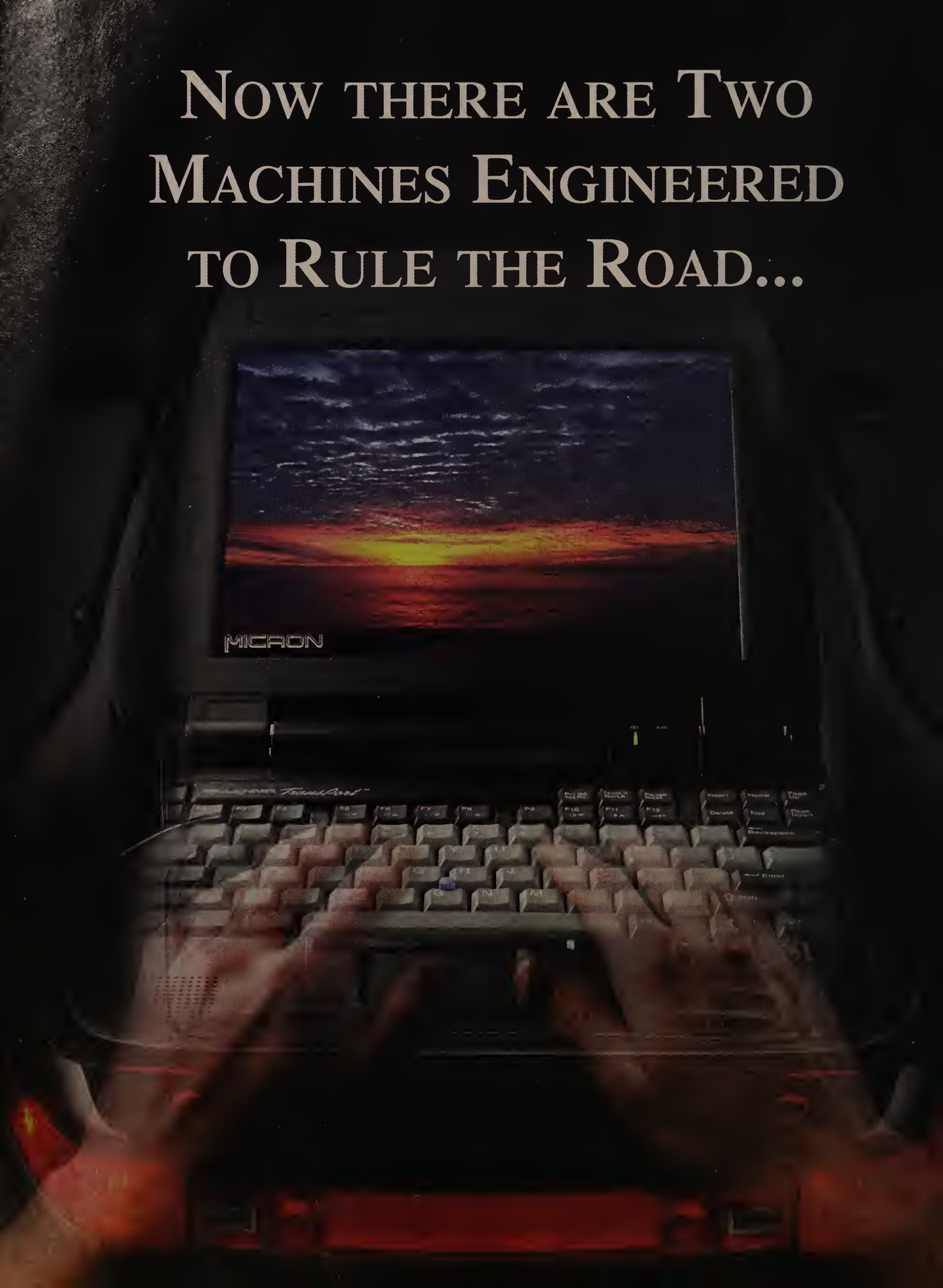

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—*Windows Sources*, April 1996

"By all accounts . . . a dead-ringer for IBM's ThinkPad . . . but performs better and saves you about $2,500."
—*PC Magazine*, April 9, 1996

Breakthrough performance:

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—*PC World*, March 1996

"The Millennia TransPort, a bench-burner of a notebook . . . delivered the highest Winstone 96 score we've ever seen on a notebook: 53.3". —*Windows Sources*, April 1996

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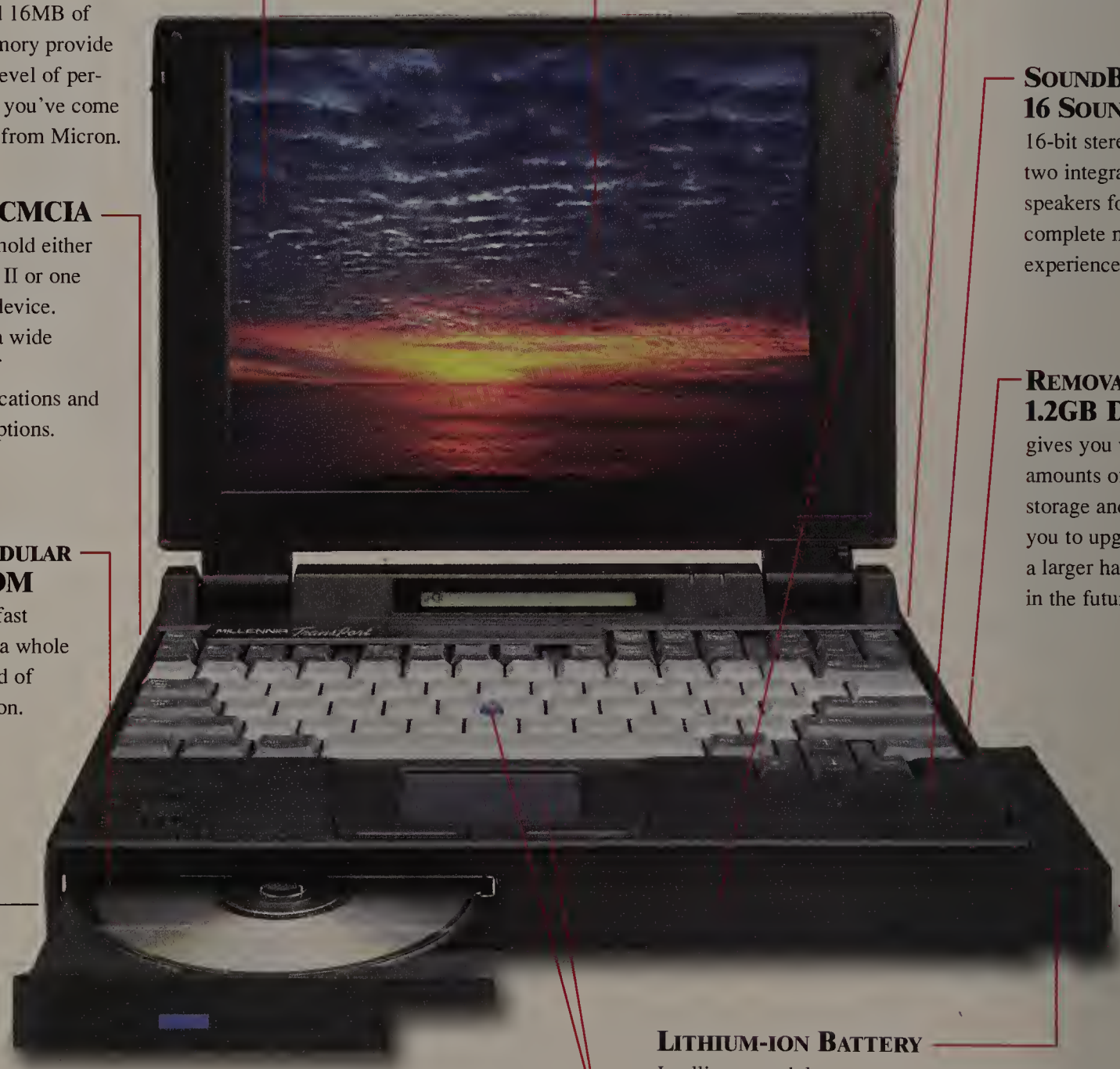

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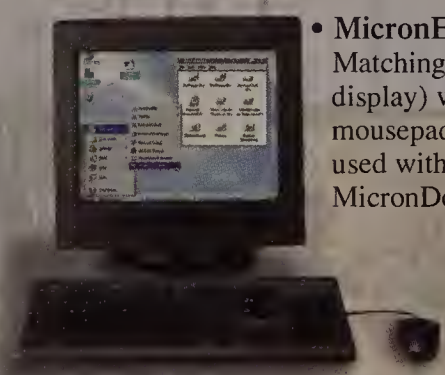

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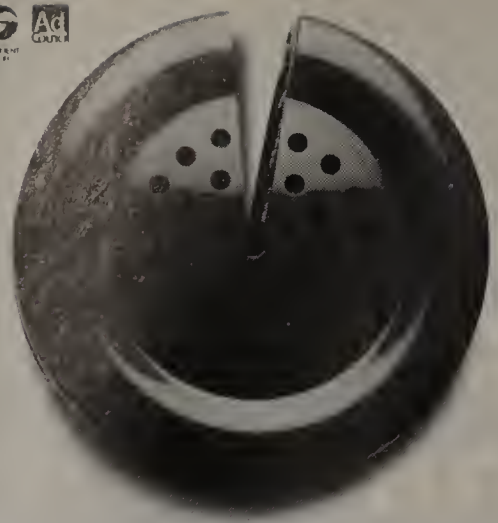

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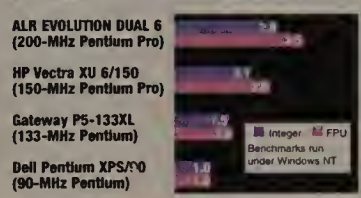

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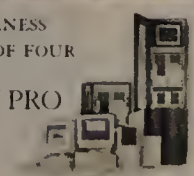

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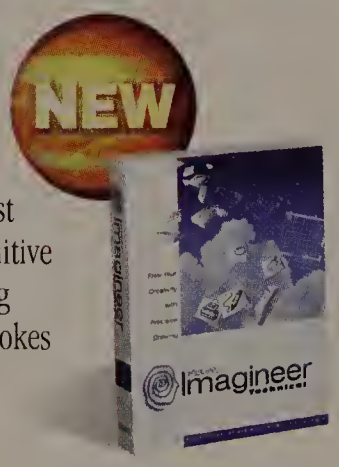

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1996 World Class Winners—and Losers

A few months ago, *PC World*'s editors were poring over early voting results for our 1996 World Class awards. With just a small percentage of votes tallied, it was still too early to tell which products would win. But one particularly interesting race was shaping up—Netscape Navigator facing off against Windows 95 for product of the year.

This month's cover story, "Best Products of 1996," reports the winners of this contest and all 82 of this year's World Class categories, from product of the year to best service and support. The results? For product of the year, Navigator pulled in 31 percent of the vote, versus 30 percent for Windows 95. For most promising software newcomer, Netscape's Web browser won again, this time with an 8 percent lead. For best Internet software, Navigator won a third time, with its closest competitor—Microsoft's Internet Explorer—barely putting up a fight.

Our congratulations to the upstart company, which started giving away its browser just 18 months ago. (International Data Group, the parent company of *PC World*, is a minority shareholder in Netscape Communications.) For Netscape, though, the battle has just begun. In this issue we preview the next versions of both Navigator and Internet Explorer (see "Internet Explorer versus Netscape Navigator, Round Three" in our *New Products* section). As you might expect, the new browsers will be roughly comparable in functions and features. Both, for instance, will add collaboration through whiteboard software. Both will beef up security, with Navigator including digital "certificates" for verifying personal identification. Both will add better programming support for building multimedia and interactive apps into Web pages. And both will continue to change rapidly. Before year's end, expect to see new versions of each that include, among other features, support for Internet directory services for locating people and e-mail addresses; this will become increasingly important as companies rely more on the Internet and intranets for day-to-day business.

Backhanded Compliment for Windows 95

Back on the desktop, Microsoft's Windows 95 walked away with the 1996 World Class award for best operating system. Microsoft's product also won this year's least-coveted award: loser of the year. It's not that voters didn't consider Windows 95 a significant step forward. It's more a case of its failure to live up to unrealistic expectations, as well as backlash against Microsoft's attempt to create a stampede mentality.

Another World Class category worth noting is most promising hardware newcomer. Here the vote was split, resulting in a tie among three products: Intel's Pentium Pro, its Pentium-166, and Iomega's Zip drive. Like Windows 95, the Pentium Pro failed to live up to expectations, choking on 16-bit Windows 3.1 software. Revisions to the Pentium Pro's chip set have improved performance, and the latest 200-MHz Pentium Pro systems do indeed outpace standard Pentium PCs when running mainstream software. But new systems with 200-MHz Pentiums or with Cyrix's 6x86/P166+ chips are edging close to Pentium Pro levels of performance at much more reasonable prices. (For test results of new PCs with these processors, see this month's lead news story, "Pentium-200: Winner by a Hair," and our Top 20 PC review, "Pentiums Meet Their Match.")

Too Good to Be True

Competition like this is great news for consumers. But sometimes claims about performance and price are too good to be true. Two stories in this issue emphasize the need to exercise healthy caution, common sense, and your legal rights when buying PC products, especially by mail. First, *Consumer Watch* columnist Roberta Furger recounts problems reported by readers who bought PCs and other hardware from PC Distributor, a Florida mail-order company that took their money and ran. Furger outlines danger signs and recommends steps for protecting yourself and seeking redress if you end up the victim of a scam.

> **Competition like this is great news for consumers, but sometimes claims about price and performance are too good to be true.**

Finally, in this month's news story "RAM Scam!" writers Angela Freeman and Dan Tynan disclose the results of their investigation into a group of companies in Nevada and southern California that buy and sell memory and other PC products. All five companies named in the article have burned customers, suppliers, and banks, with losses amounting to more than $1 million. All five have eluded legal authorities so far. Buyers beware.

Cathryn Baskin

Cathryn Baskin, Editor

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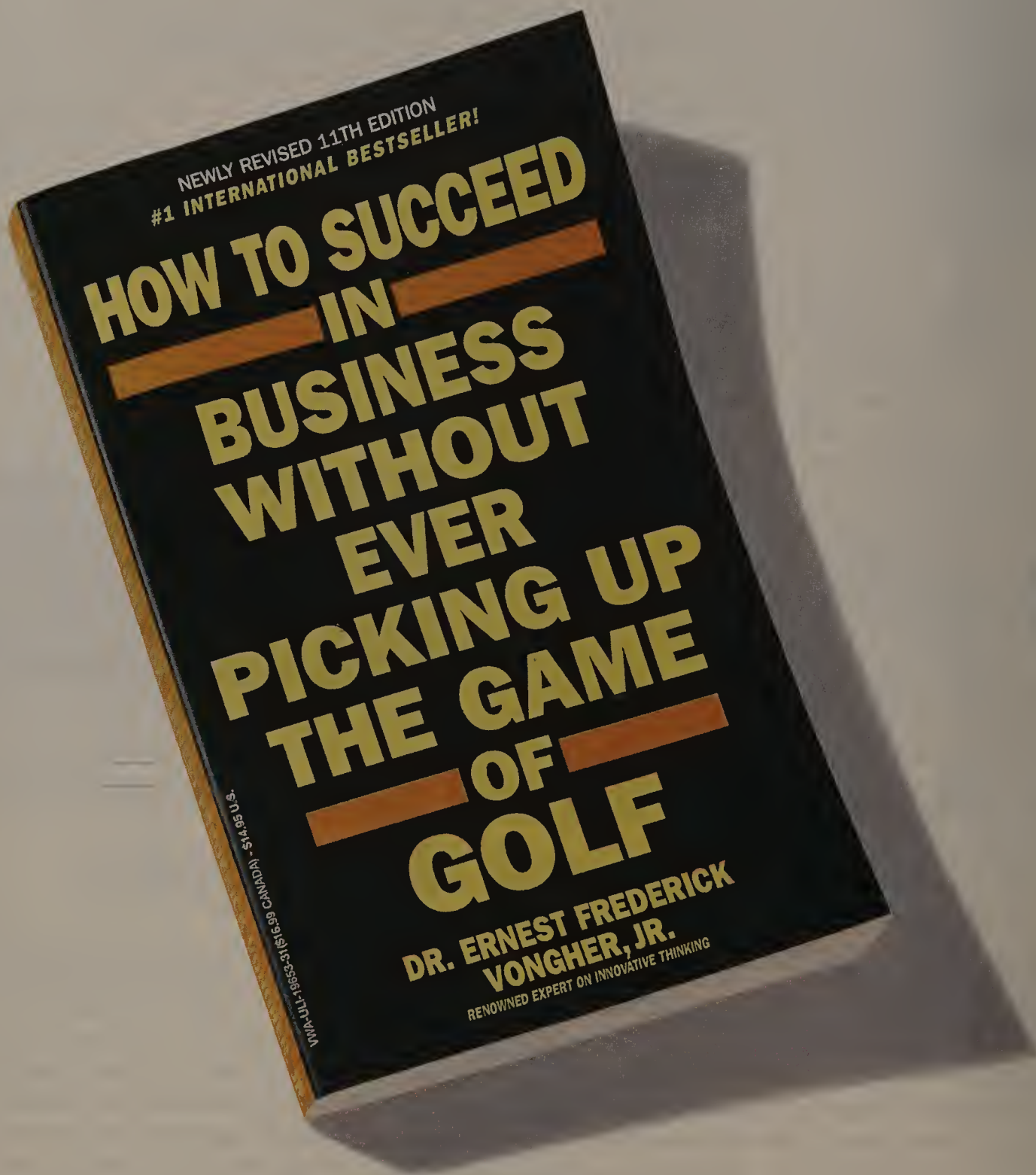

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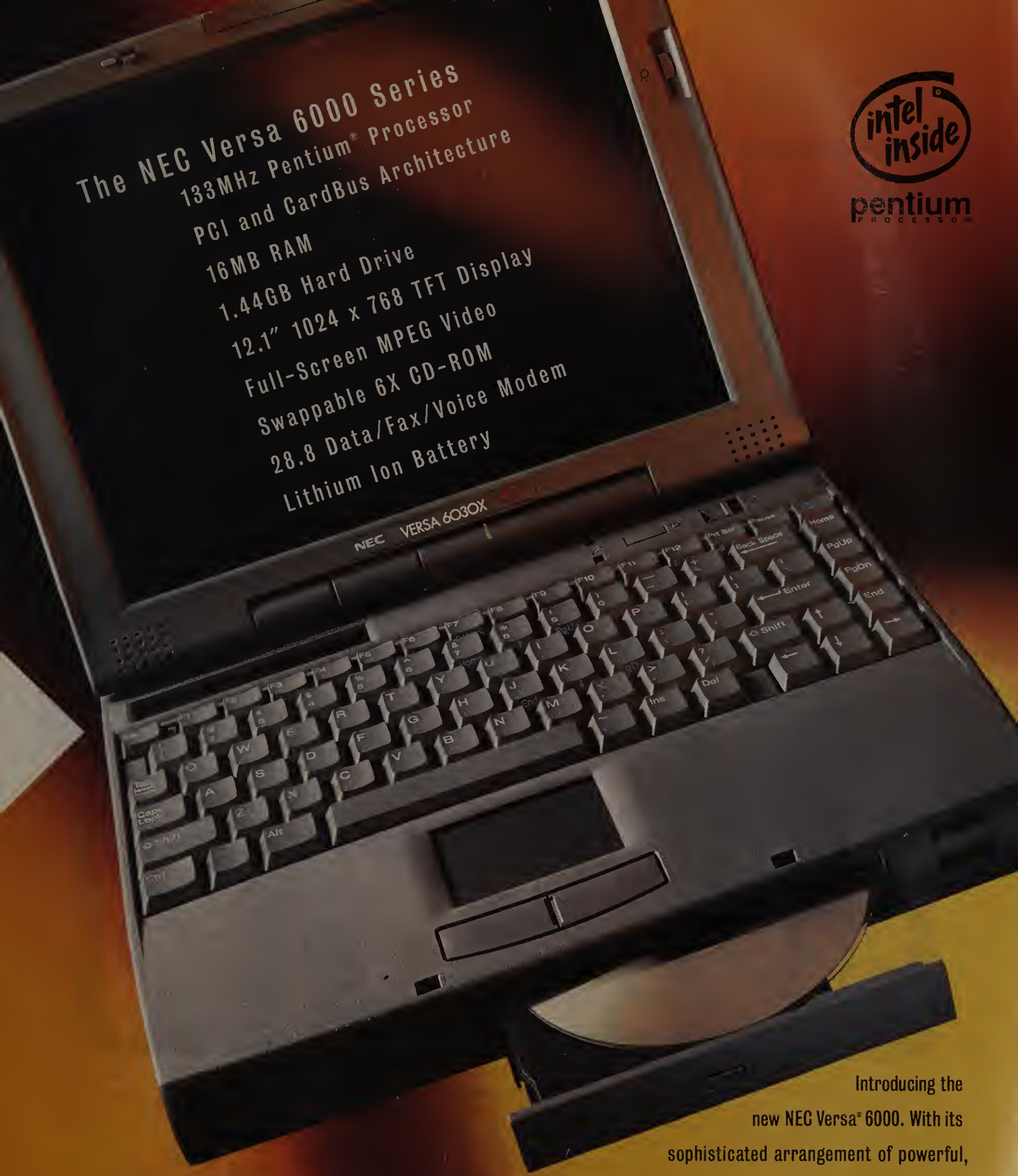

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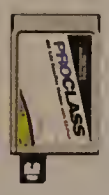

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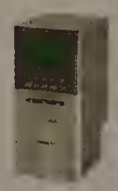

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Gigabucks for Tech Support, the Best Stuff Online Is Free

How Not to Win a Customer

I want to thank Compaq Computer for making my next computer purchase decision a little easier. After reading the *Consumer Watch* column in the May issue ["The Death of Free Support"], there is no way that I would purchase from Compaq. No free support whatsoever? Give my credit card number the minute I call for help? Get a life. I could understand some changes in support, but this decision is stupid. Maybe Compaq should get out of the small office/home office and family PC business altogether—or maybe that's actually the plan?

Thanks again to Roberta Furger for a timely and useful report.

Kelly Mutch, La Grande, Oregon

Held Hostage by Tech Support Fees

I read "The Death of Free Support" with great interest, having just been held hostage by Compaq for their support fee. After I had run my hard disk defragging utility, my computer ceased to recognize my CD-ROM drive. The supplied manual was useless, suggesting things like "check to be sure CD is not upside down." All the diagnostic programs I tried said the system was fine. So I had no choice but to call Compaq. After waiting 20 minutes, I felt used as I handed over my credit card number. Even though the technician was able to resolve the problem in less than a minute, I will never buy another Compaq machine.

Donna Wright, Pittsburgh

Pinching Pennies on the Internet

I really enjoyed the May issue of *PC World*. I've subscribed to the magazine for three or four years, and this issue is probably the most helpful of all. Of particular interest was "The Best Free Stuff Online." (OK, maybe I'm being cheap.) I'm a home PC user with a limited budget, so this issue will stay on my bookshelf for a long time. Thanks; I've already told my friends how helpful the article is.

Bryan Reeves, Eureka, Illinois

Finding the Best Free Software

I read your article "The Best Free Stuff Online" and was particularly interested in the software. I quickly discovered that the sites you listed are World Wide Web pages. While Web pages are popular, they are often slow and inefficient. It is easier to get files from the Internet via FTP [file transfer protocol], and you won't have to deal with the graphics-intensive Web.

I also note that of the five sites you listed, three are for Windows only. This leaves your OS/2 users out of the pocket. The site http://www.teamos2.org has a lot of decent links to several OS/2 Web pages with software. If you want FTP, as I and many others do, go to ftp–os2.nmsu.edu.

Christian McArthur, College Station, Texas

No More QEMM Freeze-Ups

Thank you! I recently installed Windows 95 and experienced several freeze-ups while using Quarterdeck's QEMM 8.0. I read in the May *Bug Watch* column that a QEMM 8.01 patch would correct the problem. The patch works great, and I'm back in business. Thanks again for the great tip and for a great magazine.

James E. Hennon, America Online

The Politics of Election Coverage

Congratulations on having more complete presidential election coverage in your May issue ["Election '96, Internet Style"] than our local newspapers have had all year. None of our area's papers or TV stations even mention the Libertarian party, despite polls that show overwhelming support for Libertarian principles. I don't know whether this reflects very well on *PC World* or very badly on our local Virginia news media, but in any case you have my thanks and respect for taking your journalistic responsibilities seriously.

Brandon Blackmoor, Portsmouth, Virginia

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EDITED BY CHRISTINA WOOD

Consumer Watch

The Death of Free Support

BY ROBERTA FURGER

Listen carefully next time you're on hold for technical support. You may hear "Taps" playing.

After more than a year of grumbling about the high costs of providing technical support to home PC users, Compaq Computer has decided to quit giving it away. With the introduction of its new line (the Presario series 5200, 7200, 7600, 9200, and 9600), the Houston, Texas, company began charging customers for answers to *all* questions that aren't the direct result of a product defect.

That means unless Compaq determines your problem stems from either broken hardware or buggy Compaq software (such as Compaq's Media-Pilot and Tab-Works interfaces), the answer will cost you. The charge? Thirty-five dollars per question. That's right, *per question*. Don't think you'll be able to rattle off a bunch of queries for a flat fee. Marie Morris of Everett, Washington, tried that when she had problems with her Presario 9546. "They told me I'd have to pay another $35," Morris said.

Owners of earlier Presarios *should* still qualify for free hardware support, but have your credit card handy anyway: Under a policy instituted January 1, all callers to Compaq's lines must give a credit card number to be connected with a technician. At the end of the call, the techie decides whether the question is chargeable. And *that* depends, in part, on which Presario you own—basically, the newer your computer, the more limited your free tech support. With no credit card, your phone support is limited to Compaq's 900 line, which costs up to $30, at $2 per minute. Online support is available on all major services and on the Internet.

Warranty coverage has also changed with the new Presario line. On-site service is now limited to 90 days from the date of purchase. (Owners of earlier models get one year.) The remaining nine months of coverage are handled on a carry-in basis.

WHERE COMPAQ LEADS ...

Although Compaq expects other PC companies to quickly follow its lead, so far only AST has shortened its warranty. Beginning with its spring line, all Advantage PCs come with a one-year warranty. Others are hinting at changes, though. NEC, for example, indicated that changes were afoot that would mean "less service and support for customers," according to a company spokesperson. Hewlett-Packard isn't making changes to its hardware support, but it will begin limiting free support on bundled software to 90 days after the first call.

For over a year, many PC companies have been charging for support on software—even when the package came bundled with the system. But it's often next to impossible to know what's causing a problem. Software conflicts are often disguised as hardware failures, and it can take days to figure things out. And what about out-of-date drivers or version incompatibilities? Compaq didn't have definitive answers to those questions, but according to Gus Kolias, Compaq's vice president of customer service, customers should expect to pay.

READ THE MANUAL, DUMMY

Driving the change is the way home PC owners are using technical support, according to Kolias. The lion's share of today's calls "go beyond the purview of why tech

PHOTO ILLUSTRATIONS: SILVIA OTTE

304 PC WORLD • MAY 1996

Ideal Configuration, Wrong Price

I'm looking at the Top 20 PCs review in your April issue. Number five on the Power Desktops list is a Dell Dimension XPS P166c system for $3679. Only problem is, Dell says it ain't so. The price I was quoted for the same configuration is more expensive than what you stated. I'm thinking about getting a Dell system, and the one you listed is a heck of a deal—but since my Dell customer service rep says that it doesn't exist, can you tell me where I can find one?

Patrick Solomon, Internet

Editor's response: Dell is right. Due to a miscommunication between the

SILVIA OTTE

company and *PC World*, the price we printed in April was low. The correct price ($4299) appeared in our May issue. We apologize for the inconvenience this error caused you. The good news is, the system continues to drop in price. This month the street price for the same model is $3359.
—Tracey Capen, executive editor

Desktop Shortcuts for Kids

Thank you for your article on Windows 95 productivity ["Windows 95 at Warp Speed"]. There was a brief mention of Shortcuts on the desktop for children. I have created a Shortcut to a folder that contains Shortcuts to the .exe files of all the games that my 4- and 6-year-old children play. This reduces the risk of their playing with programs or files that they might damage, though it didn't stop my 4-year-old from opening 16 games of Jeez Ball simultaneously!
J. Brian Ridd,
Winnipeg, Manitoba

From Single Speed to Warp Speed

Great article ["Windows 95 at Warp Speed," April]! I discovered that I'd been running my Dell Pentium machine's quad-speed CD-ROM drive at single speed since I installed Windows 95 in August. Oh well. Thanks for the shortcuts on how to test this and other important features of my system.
Jeffrey Lubitz, Reston, Virginia

Author's note: Actually, your CD-ROM drive wasn't running at single speed; its caching was simply optimized for a slower drive, which affected its performance. Glad the tip helped. *—Scott Spanbauer, contributing editor*

Voice Your Zealotry Here

I wonder how many times writers will refer to the various Internet newsgroups without dealing with the many negative aspects of such "discussion" groups. The article "Election '96, Internet Style" perfunctorily mentioned five newsgroups where "you can voice your opinion." In my opinion, the sentence "Want to argue with strangers you'll never have to meet?" is not nearly enough of a warning label about Internet newsgroups.

In my experience, most of these newsgroups are infested with thoroughly unpleasant people. Overstuffed egos, dishonesty, bigotry, and zealotry abound. There are other political newsgroups besides the ones you mentioned, if one really wishes to do that sort of thing. But as far as I'm concerned, an honest, sensible person who tries to post in these groups is in for a very hard time.
Edgar J. Lawrence II, Dayton

Corrections and Clarifications

Contrary to information given in "Incredible Expanding Drives" (March), Fujitsu does not provide a toll-free technical support number. In addition, the street prices of the Toray Phasewriter Dual drive and media are actually $649 and $49, respectively.

In "Hot Picks for the Home Office" (April), the data transfer rate for the Iomega Ditto Easy 800 drive was stated incorrectly. It is 1 megabit per second.

Two Web addresses appeared incorrectly in May's "The Best Free Stuff Online." The Free Online Dictionary of Computing is at http://wfn–shop.princeton.edu/cgi–bin/foldoc?bg=on&action=Home&query=, and the Business Job Finder is located at http://www.cob.ohio–state.edu/dept/fin/osujobs.htm. In addition, the free copy of F-Prot Professional discussed in the article is available only in a DOS version, not Windows.

An item in *Feedback* (May) provided a BBS number for the Consumer Information Center. The group can also be reached on the Web at http://www.gsa.gov/staff/pa/cic/cic.htm or via e-mail at catalog.pueblo@gsa.gov.

In June's Top 20 PCs review ("Best of the Brands"), the price of the Digital Celebris GL 5166ST was listed incorrectly. The price is $4499.

PC World regrets the errors.

Letters *welcomes your responses and ideas.* *See page 14 for contact information.*

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When Do You Call In the Consultant?

If your company needs nuts-and-bolts technical help, does it make more sense to hire an outside consultant or to bring a full-time technical guru on board? This month Jim Wolande, CEO of Triangle Technologies, which offers data communications equipment and services in Downers Grove, Illinois, explains how he weighed the pros and cons of third-party versus in-house tech support—and ultimately hired out. —*Editor*

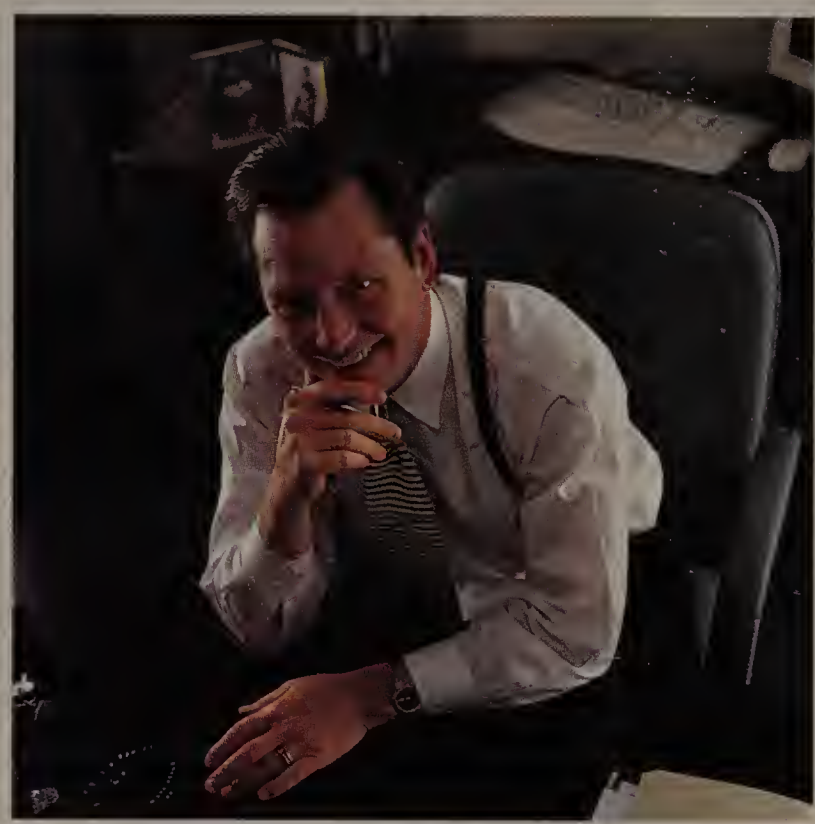
Even Experts Need Help

Even if you already have an in-house technical team, there are plenty of times when you need extra help—say, when a special project such as a major system upgrade threatens to take your technicians away from their routine duties. But are you better off hiring an in-house expert or farming out those new tasks to strangers?

My 26-person company is in the computer business, so you'd think that for us this question would be a no-brainer. After all, we pride ourselves on providing our customers with state-of-the-art data communications equipment and services. But until recently we were like that old yarn about the shoemaker's children going unshod. Despite our technical knowledge, we were just as susceptible to time-wasting paper shuffling and duplicated effort as any of the banks, retailers, and other companies that come to *us* for help.

We started our business by putting all our inventory, order entry, and other records into an old-fashioned relational database (with terminals linked to a 486 server running the PICK operating system). But faced with a 35 percent annual growth rate, we soon found our systems couldn't keep up. When order entry people entered customer information, for example, people in sales, inventory, and accounting would look up the paper order and reenter the data into their departmental systems.

To get the kind of technology base we needed—stable, powerful, flexible, and secure—we knew we'd have to spend big money upgrading our desktop PCs and network server to Pentiums, and our operating system to Windows NT. We'd also have to invest in a customer information system, specialized software that would let everyone in the company share the same bread-and-butter information. All of this cost $200,000, the biggest expense my company ever had, and that didn't include the cost of hiring a technical specialist to install and maintain it.



Jim Wolande, CEO of Triangle Technologies, weighs the pros and cons of third-party help.

We weighed the pros and cons of hiring a full-time technician. On the pro side, we felt an in-house technician would gain a deep knowledge of the company's needs. It would be easier to monitor the employee's work, and in the long run they could be less expensive than consultants.

But the cons list proved longer. We needed someone with sophisticated networking skills. The average network administrator with Novell NetWare certification costs around $50,000 annually, and someone with the additional skills we needed in SQL Server, PowerBuilder, and Windows NT commands twice as much. While we might have been prepared to spend big bucks on the right person, I knew that finding a technician with those skills in the Midwest—and then keeping them out of the hands of much wealthier companies—would be difficult.

Time was also an issue. We wanted to get our hardware and software installed quickly so that we could become more productive right away. But it would easily take four months to find and hire someone and get them up to speed. Finally, we wondered what our technical guru would do to keep busy once everything was up and running.

Going Outside: Ins and Outs

Next we weighed the pros and cons of hiring consultants. On the pro side, we felt consultants are always available; they're not going to be hired away. And since most consulting firms offer teams of experts, we'd be more likely to get a complete, well-rounded perspective.

Still, consultants are chancy for two reasons: They can cost a fortune if you don't monitor their time and services diligently; and many consultants work off-site unless other arrangements have been made, so it's easy to fall into the "out-of-sight, out-of-mind" trap. This

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After interviewing several consultants, we hired a highly reputable local firm, DC Systems of Oakbrook Terrace, Illinois. We liked them because they laid out all the choices facing us and were realistic about prices. They estimated $42,000 per year for developing and overseeing the database; that's $70,000 less than the $112,000 that a full-time in-house staffer would have commanded in salary and benefits. As an outside source, they also were able to give us an objective view that an in-house person may have been reluctant to provide.

Keeping Control of Costs

Unfortunately, we learned the hard way about what it takes to manage even the best consultant relationship. For example, we had told another team of consultants, whom we had earlier hired to develop our accounting software, that we needed some code written to link DC Systems' order entry and inventory systems with the accounting software. But we didn't specify a due date, and two months went by without any sign of the needed code. As a result, the implementation of our new system was delayed 70 days and we spent an additional $15,000 to $20,000, about 25 percent more than the project might have cost had we paid closer attention.

After that, we monitored every detail. Our department heads and the consultants now have weekly meetings in which each order of business is spelled out and agreed to in writing, with time frames that we set. And we stipulated a to-do checklist that must accompany every task.

By managing the relationship and the processes more closely, we're not only able to make consulting costs more reasonable, but we also get the exact type of expertise we need—when we need it.

Edited by Bronwyn Fryer

Bronwyn Fryer is a contributing editor for PC World. *If you use PCs to manage people and other resources in a business environment, we want to hear from you—we pay $300 for published columns. See page 14 for contact information.*

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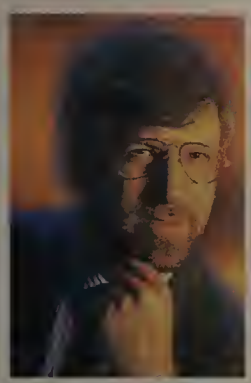
E-Mail Troubles? You Have No Idea!



E-mail is like bad breath or body odor. If you've got a problem with it, you're probably the last to know.

And guess what? You have a problem. Short of asking, you can't begin to find out what a particular message will actually look like once it's made its way to someone else's screen. In fact, you can't even be sure where it's been.

Think of it as the fax problem, only worse. Do you know if your fax machine is sending pages with ugly dark stripes down the middle or with your company's name misspelled in the header? Neither did the correspondents I notified. And compared to what can happen with e-mail, those glitches are downright trivial.

Just this morning I got the latest piece of useless e-mail that had never been meant for my eyes. It happens all the time. After somebody sends me a press release via an e-mail list, I get replies from dopes who apparently set their e-mail packages to "answer all" recipients on any distribution list. Within a company, this may be a fine idea, if only to demonstrate to the boss that you are minding the store. It's not so wonderful when your reply annoys a hundred people in the outside world who don't know you from Adam Ant.

And address lists? You may like to send so-called blind copies so that your recipients have no idea how many other people are seeing that missive supposedly meant "for your eyes only." Unfortunately, many e-mail systems won't let you do so—or worse, pretend to and then screw up when they send messages through gateways to the Net.

By Stephen Manes

Having to scroll through dozens of e-mail addresses before getting some crummy two-line message is a productivity disaster; even worse is the thought that any jerk who's received the e-mail can steal the list whole.

Nightmare Attached

Then there's the nightmare of attached files, which presumably should arrive in the same state they left. My editors and I routinely exchange versions of my column over CompuServe; no matter how often it travels back and forth, it retains its Microsoft Word formatting.

But we do not even attempt to send the file as an attachment via the Internet, because we know that it's a surefire recipe for disaster. To traverse the Net, some of whose denizens remain in the world of 7-bit ASCII, attached files typically are encoded into text files that look like gibberish. That would work if the gibberish were produced and decoded in a standard way. No such luck.

The scheme known as uuencode/uudecode is the most popular. But others flourish, such as the Mac-oriented BINHEX. And coming on strong is MIME, which stands for Multipurpose Internet Mail Extensions. MIME describes the structure of a message rather than the methods used to encode the data—though it prefers an encoding scheme called base64.

Things are changing fast. But for the moment, the service that best handles attachments to and from the Net is probably America Online. It's far from perfect, though; for one thing, it can't decode messages with multiple attachments. The Microsoft Network automatically encodes outgoing attachments with uuencode and can decode some inbound uuencoded attachments, but all it can do with MIME stuff is hand you the undecoded text. CompuServe treats all incoming attachments as undecoded text and simply refuses to send messages with attachments via the Net at all. Both CompuServe and MSN say they're working on MIME support.

Some mail programs have sophisticated encoding and decoding built in; many don't. You can get all sorts of add-on decoders for free, but most of the ones I've seen begin with unpleasant notices that they're still in beta and you use them at your own risk.

> **We never even attempt to send a file as an attachment over the Internet. That, we know all too well, is a surefire recipe for disaster.**

Even assuming your recipient can decode your attachment properly, another problem remains: Does your recipient have the tools to read it? If you send a Word 6 file, woe betide your recipient who never upgraded from Word 2. The only sure thing remains plain ASCII text, which of course summarily loses all formatting and, if it ends up doing something stupid like including lots of carriage returns, will cause major headaches in its own right.

Remember, only some of your correspondents will tell you about these problems. So every now and then, it's worth asking a few people you trust how your e-mail is looking nowadays.

Just hope you can decode the answer.

PC World *contributing editor Stephen Manes is a columnist for the* New York Times *and coauthor of* Gates: How Microsoft's Mogul Reinvented an Industry *(Touchstone/Simon & Schuster, 1994, 800/223-2348).*

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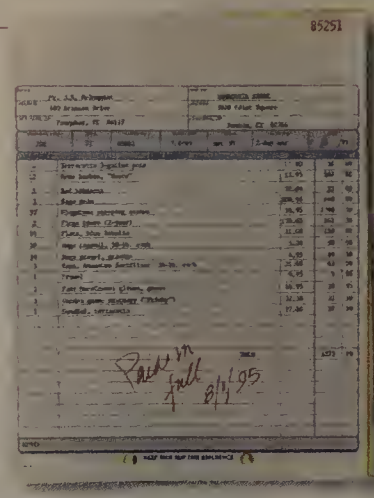

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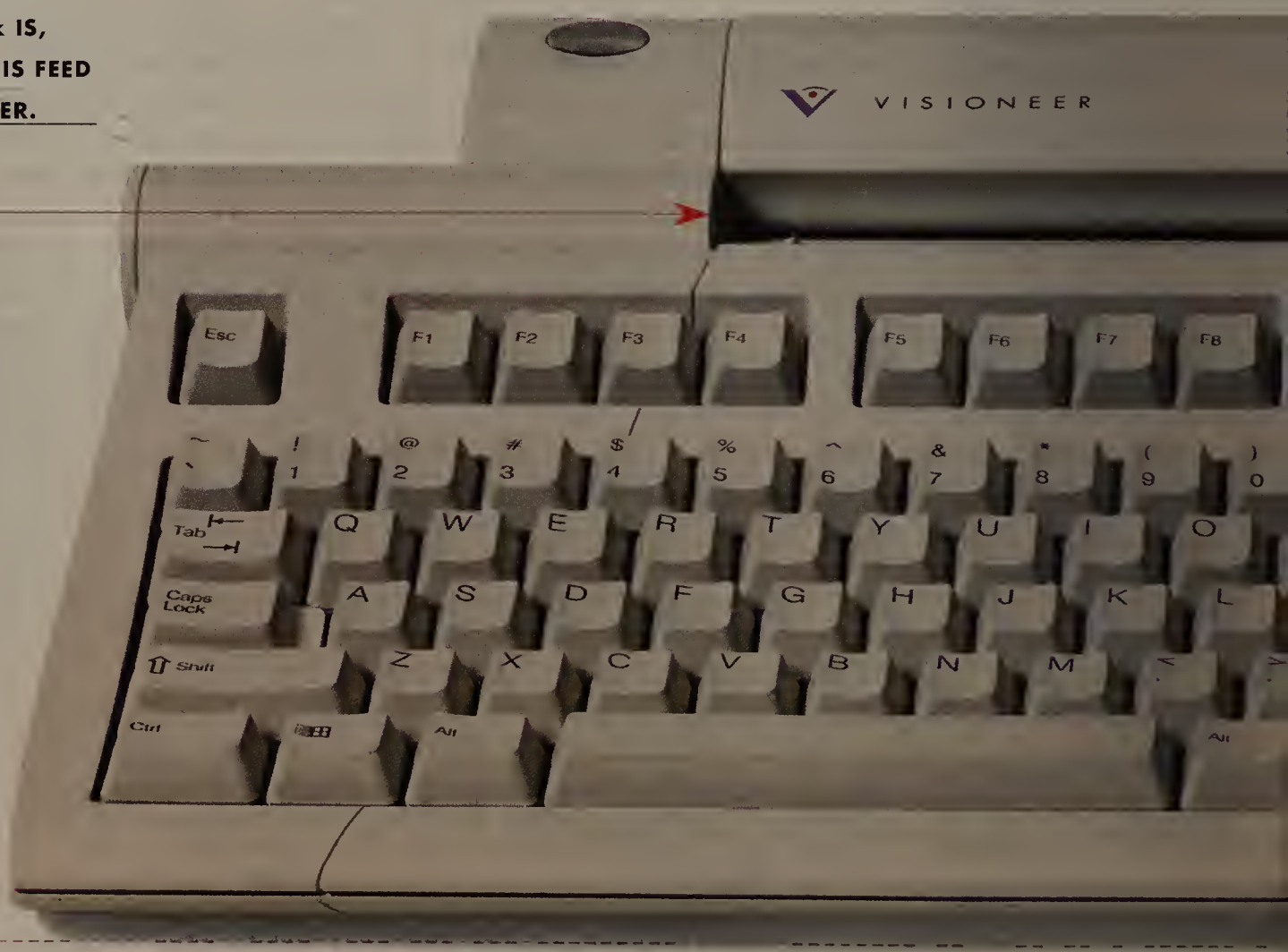

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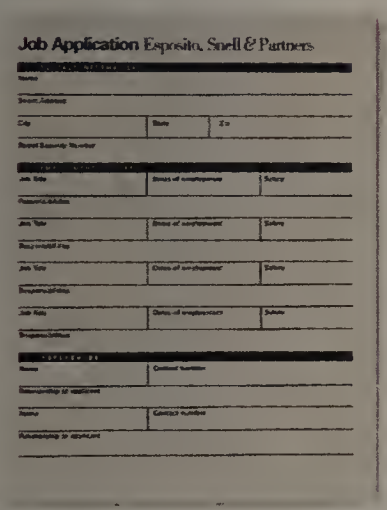

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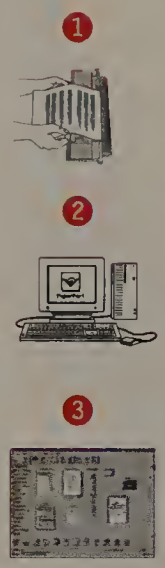

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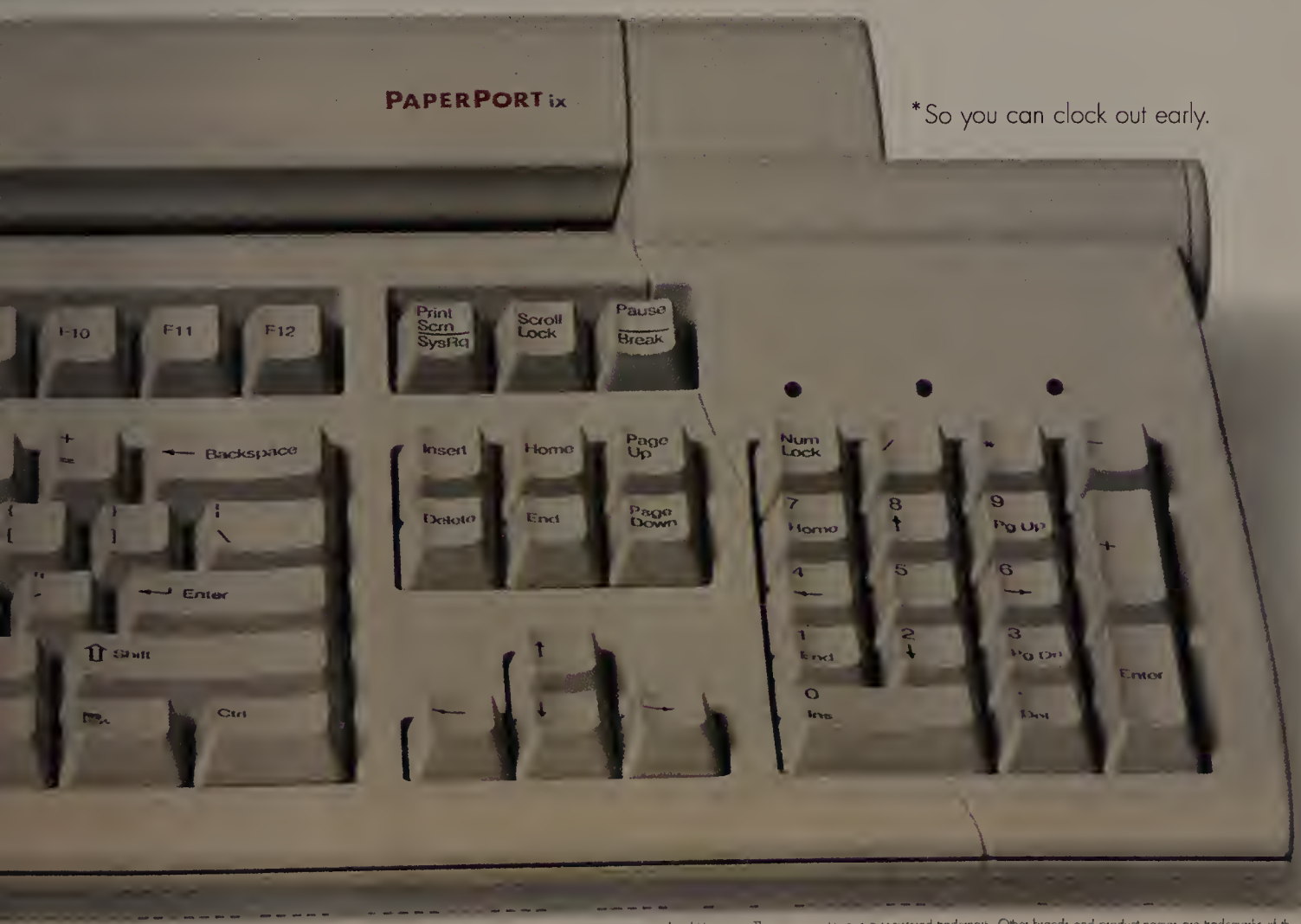

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PC MAGAZINE EDITORS' CHOICE™
February 20, 1996
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Pentium-200s FASTER BY A HAIR

TOP PERFORMERS among the first Pentium-200 PCs, clockwise from upper left, are the Unisys Aquanta DM, the Quantex QP5/200 SM-2, the Gateway 2000 P5-200, and the Micron P200 Millennia. Their prices range from $3158 to $3999.

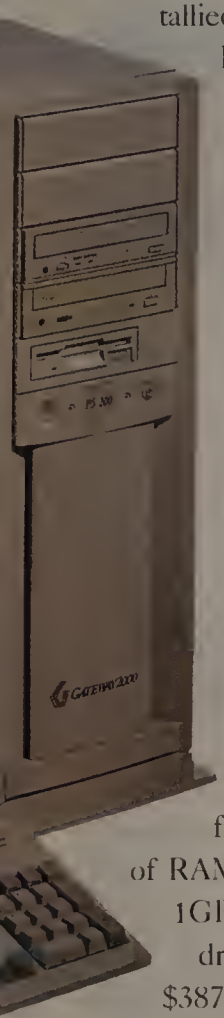
Edited by Andy Reinhardt and Randy Ross

Though Intel has pushed the Pentium chip to its outer limits, the first crop of 200-MHz Pentium PCs barely outrun Pentium-166s. Even so, they're great deals for high-end PCs.

TEST DRIVE

In microprocessor terms, the Pentium is geriatric. Intel keeps cranking out faster versions of the chip, but with each successive jump in the Pentium's clock speed, the rise in performance gets smaller and smaller. Witness the latest rollout, a 200-MHz version that will show up in desktop PCs midsummer: The chip's name shouts speed, but our tests reveal only a minor gain over Pentium-166s.

Still, these 200-MHz systems represent the top of the Pentium line, and the units we saw will be priced aggressively. Early Pentium-200 PCs turned in the best Windows 95 PC WorldBench scores we've ever tallied (except for 200-MHz Pentium Pro systems, which are still more expensive), yet typically cost only $150 to $200 more than similarly configured Pentium-166s. This represents a continuation of the price/performance trend vendors have been following for several years, offering faster systems with more storage and better peripherals without increasing prices. What's interesting here is that the introductory prices for the new Pentium-200 systems are even lower than those we saw for less richly configured Pentium-166s that debuted in January. For example, the 166-MHz system from Dell last winter had 16MB of RAM, 512K of secondary cache, a 1GB hard drive, a 6X CD-ROM drive, and a 28.8-kbps modem for $3879. The new 200-MHz Dell PC has the same RAM and cache configurations, plus a 2.5GB hard drive and an 8X CD-ROM drive for only $3429. The moral of this story: Look beyond processor speeds and consider the total package when shopping for a high-end PC.

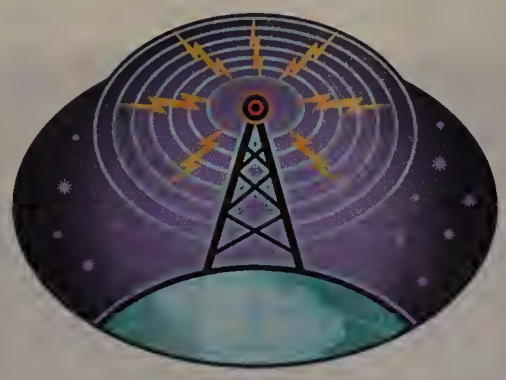


Incremental Improvements

Our tests of preproduction models from six PC vendors show minor speed gains of 2 to 6 percent over comparably equipped 166-MHz Pentium PCs. This is significantly less than the 20 percent difference in the clock speeds of the CPUs—and less than the 10 to 15 percent advantage for the Pentium-200 predicted by Intel. When we stacked up a 200-MHz Pentium against comparably configured 200-MHz Pentium Pro systems, the Pentium was about 7 percent slower overall in our Windows 95–based PC WorldBench test suite.

Why such minimal improvements? The culprit is the system bus—the pathway between the CPU and other components. While the Pentium's internal processing speed has skyrocketed from 60 and 66 MHz at its introduction three years ago to 200 MHz today, the speed of the system bus has stayed the same. P-90, P-120, and P-150 computers use a 60-MHz system bus, and P-100, P-133, P-166, and P-200 PCs use the faster 66-MHz bus.

Higher clock speeds allow Pentiums to process instructions faster and to access their small internal caches more quickly, but even the fastest Pentiums cross the same 60- or 66-MHz bus to use secondary cache or system memory. That's why, for the last few Pentium iterations, we've seen diminishing gains in performance with each rise in the internal processing speed.



Breaking News

INTERNET APOCALYPSE? A Gartner Group analyst has added his name to the list of doomsayers predicting that the increasing traffic on the Internet could hobble its performance and decrease reliability. Gartner's Doug Cayne points to periodic brownouts and prolonged breaks in service as problems already affecting the Net's busier neighborhoods. Moreover, the population on the Internet is supposed to triple in the next few years, causing "a backbone meltdown," he says. Cayne predicts that the Net will survive through continual rebuilding by service providers, though not without significant downtime and loss of productivity. —R. O.

A MEMORY UTILITY THAT WORKS: It's been a bad year for Win 95 memory utilities: Syncronys Softcorp's SoftRAM95 promised to double PC memory but actually slowed performance—and was eventually recalled by the vendor (*Breaking News*, March). But we're impressed with preliminary lab tests of Helix Software's $80 Hurricane for Windows 95. On an 8MB Win 95 system, a beta copy boosted performance on the PC WorldBench benchmark by up to 10 percent on individual apps compared to the same PC without Hurricane. It produced larger gains when six apps were loaded. While Hurricane does help performance, It can't make a PC with 8MB perform like one with 16MB. —L. M.

(continued on page 47)

PHOTOS: JOHN GREENLEIGH; ILLUSTRATION, ABOVE: JEFFREY PELO

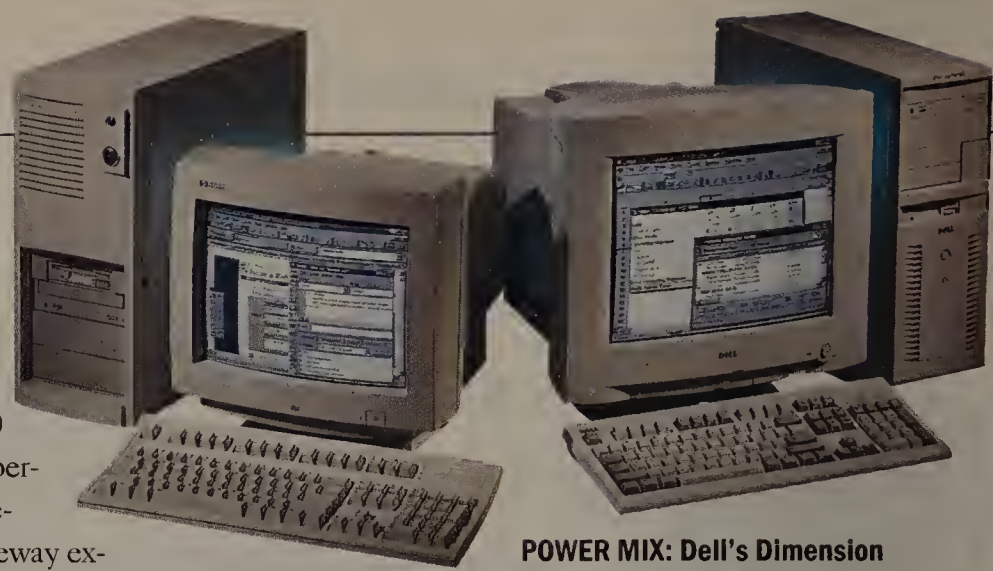
Top of the News

Many industry watchers believe the Pentium-200 is a natural-born underachiever. "The incremental performance increase of the P-200 over the P-166 is not going to be that significant," says Linley Gwennap, editor in chief of *Microprocessor Report* in Mountain View, California. "It's the same old Pentium running a little faster."

High-End Home PC

Although the newest, fastest PCs are typically bought by power users who'll pay top dollar for breakneck speed, Intel's Pentium-200 marketing initially will target home computer buyers. Why? The company is now pushing the Pentium Pro as the mainstream business choice and aiming regular Pentiums at home users, says Frank Spindler, Intel's Pentium processor marketing manager.

P-200s aren't cheap. Gateway's P5-200 is $3999 with a 2.5GB hard drive, a Matrox 2MB WRAM graphics card, a 17-inch monitor, a 28.8-kbps modem, and a CD-Recordable drive. This adds up to a $151 premium over a comparably configured P-166 and $265 more than a P-133, for 5 percent and 10 percent faster performance, respectively. Gateway expects P-200s to appeal to high-end buyers, so it's bundling a CD-R drive—and later, videoconferencing—into all models.



POWER MIX: Dell's Dimension XPS P200s (right) matched the Gateway's speed but costs less. Hewlett-Packard's Vectra VL4 5/200 MT (left) was the slowest.

For $700 less, Quantex's $3299 QP5/200 SM-2 matches the Gateway P5-200 feature for feature except that it sports 16MB more RAM and a Number Nine Imagine128 graphics card with 4MB of VRAM. While the Quantex was the fastest among the six P-200s, its score was only 3.3 percent better than that of the speediest comparable P-166 we've reviewed. (The QP5/200's 32MB of RAM and 512K secondary cache also gave it an advantage in our tests over P-200s with lesser configurations.)

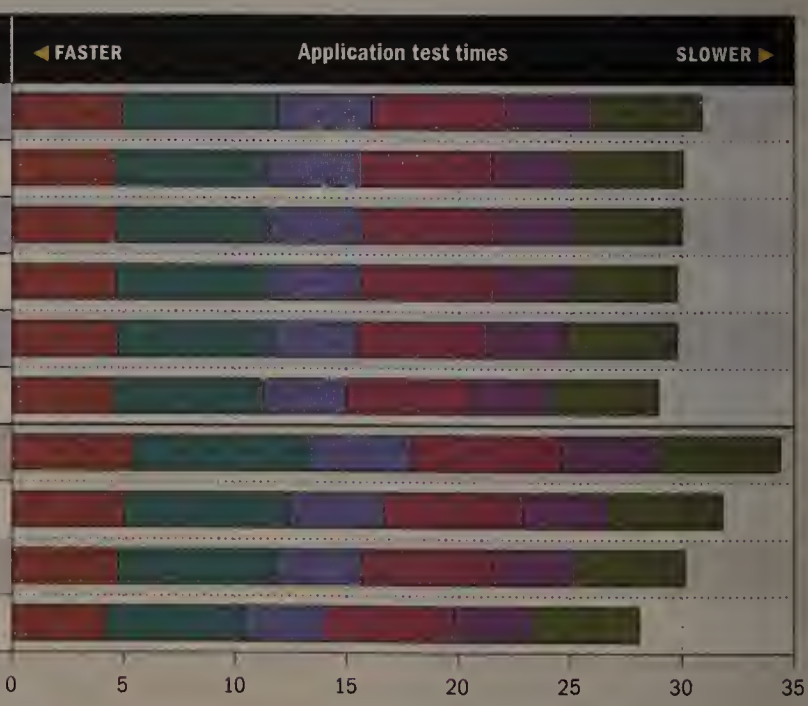
Like Gateway's P5-200, Dell's Dimension XPS P200s ran about 5 percent faster than comparable P-166s. Priced at $3429, the P200s comes with a 2.5GB hard drive, an Imagine/II video card with 4MB of VRAM, a 17-inch monitor, a 28.8-kbps modem, and an 8X CD-ROM drive. Micron's P200 Millennia provides a 2.5GB hard drive, an 8X CD-ROM, a Diamond Stealth 3-D 2000 graphics board with 2MB of RAM, and a 17-inch monitor for $3158.

Hewlett-Packard's Vectra VL4 5/200 MT is priced at $3650 and includes a 1.6GB hard drive, a Matrox MGA Millennium graphics card with 2MB of WRAM, and a 4X CD-ROM drive (it'll have an 8X drive by fall, HP says). The monitor isn't included in this price; with an $800 17-inch display the cost would be $4450. The HP sys-

TEST REPORT

Pentium-200 PCs Eke Out Tiny Gains Over P-166s but Trail Pentium Pro-200s

▼ PC WorldBench score		CPU	RAM (MB)	Secondary cache (K)
201	HP Vectra VL4 5/200 MT	Pentium-200	16	256
208	Dell Dimension XPS P200s	Pentium-200	16	512
208	Gateway 2000 P5-200	Pentium-200	16	512
210	Micron P200 Millennia	Pentium-200	16	512
210	Unisys Aquanta DM	Pentium-200	32	256
216	Quantex QP5/200 SM-2	Pentium-200	32	512
182	Average of 30 P-133 PCs	Pentium-133	16	256
196	Average of 19 P-166 PCs	Pentium-166	16	256
208	Average of 2 P-166 PCs	Pentium-166	32	512
225	Average of 4 PPro-200 PCs	Pentium Pro-200	32	256



Word 7.0 | Excel 7.0 | Picture Publisher 6.0 | Paradox 5.0 for Windows | WordPerfect 6.1 for Windows | 1-2-3 release 5 for Windows

Methodology Higher PC WorldBench scores are better. For a description of the PC WorldBench 1.0 tests, see the Test Report in this month's system review.

Data based on PC WorldBench testing conducted by the PC World Test Center. All rights reserved.

In the Pipeline

Intel knows the current Pentium design is running out of steam. That's why the company is developing two new processors that fall somewhere between the Pentium and the Pentium Pro in performance. The upcoming P55C and Klamath CPUs will target mainstream business and home PC users.

The P55C, slated for release by the end of the year, is a souped-up Pentium with a larger internal cache (Intel won't say how large). The bigger cache should reduce the performance hit from system bus bottlenecks by letting more work occur within the high-speed core of the processor. The P55C also includes Intel's MMX extensions, a series of instructions that improve performance of multimedia applications. Intel says P55C-based PCs probably will be widely available by early 1997.

Also slated for 1997 is a Pentium Pro variant, code-named Klamath and sometimes called Pentium Pro Lite. Analysts say Klamath is a scaled-down Pentium Pro without the built-in secondary cache. This change would reduce manufacturing costs and make Pentium Pro-based systems more affordable—but also slower.

Meanwhile, don't take your eyes off Cyrix, which plans a 150-MHz 6x86 chip that will run on a zippy 75-MHz bus the company is developing with PC vendors.

tem was roughly 2 percent faster than similarly equipped P-166s. Rounding out our P-200 preview is the Unisys Aquanta DM, which squeaked by comparable P-166s by 2 percent. Priced at $3995, the Unisys system includes a 1.6GB hard drive, a 4X CD-ROM drive, a Number Nine Vision 330 video card with 2MB of DRAM, and a 17-inch monitor.

Prices to Drop

Although current Pentium-200 systems might be a tad pricey for the majority of home and small-business buyers, prices are expected to drop soon. According to Intel's Spindler, today's $3000-plus P-200s should fall to about $2500 later this year.

Some power users, particularly those running Windows 95, may opt for the P-200 to squeeze a bit more performance out of compute-intensive applications such as spreadsheets and computer-aided design. But mainstream business users should consider all the CPU options available, including Pentium Pros and Pentium-class chips from Intel competitors AMD and Cyrix. Considering how close the performance of P-200s is to that of P-133 and P-166 systems, you should pay more attention to prices and configurations than to clock speeds when shopping for a new PC.

—Jeff Bertolucci

Dell Dimension XPS P200s

Dell Computer, 800/613-3355
Pricing: From $3429
Reader service no. 835

Gateway 2000 P5-200

Gateway 2000, 800/846-2000
Pricing: From $3999
Reader service no. 836

HP Vectra VL4 5/200 MT

Hewlett-Packard, 800/752-0900
Pricing: From $3650
Reader service no. 837

Micron P200 Millennia

Micron, 800/223-6571
Pricing: From $3158
Reader service no. 838

Quantex QP5/200 SM-2

Quantex Microsystems, 800/896-4898
Pricing: From $3299
Reader service no. 839

Unisys Aquanta DM

Unisys Corp., 408/434-2125
Pricing: From $3995
Reader service no. 840

Breaking News

(continued from page 45)

POWER MACS DO WINDOWS: A new Apple Power Macintosh system will run DOS, Windows 3.*x*, and Windows 95 applications through a built-in Pentium chip. The Power Mac 7200/120 PC Compatible, due to ship in June, includes a card with a 100-MHz Pentium processor and RAM on it. You'll be able to toggle between the Mac OS and Windows. The system will cost about $2799. If you've already got a Power Mac, you can add a PC Compatibility card sporting 8MB of RAM and a 100-MHz Pentium for $1049 or a 100-MHz Cyrix CPU for $799. —G. M.

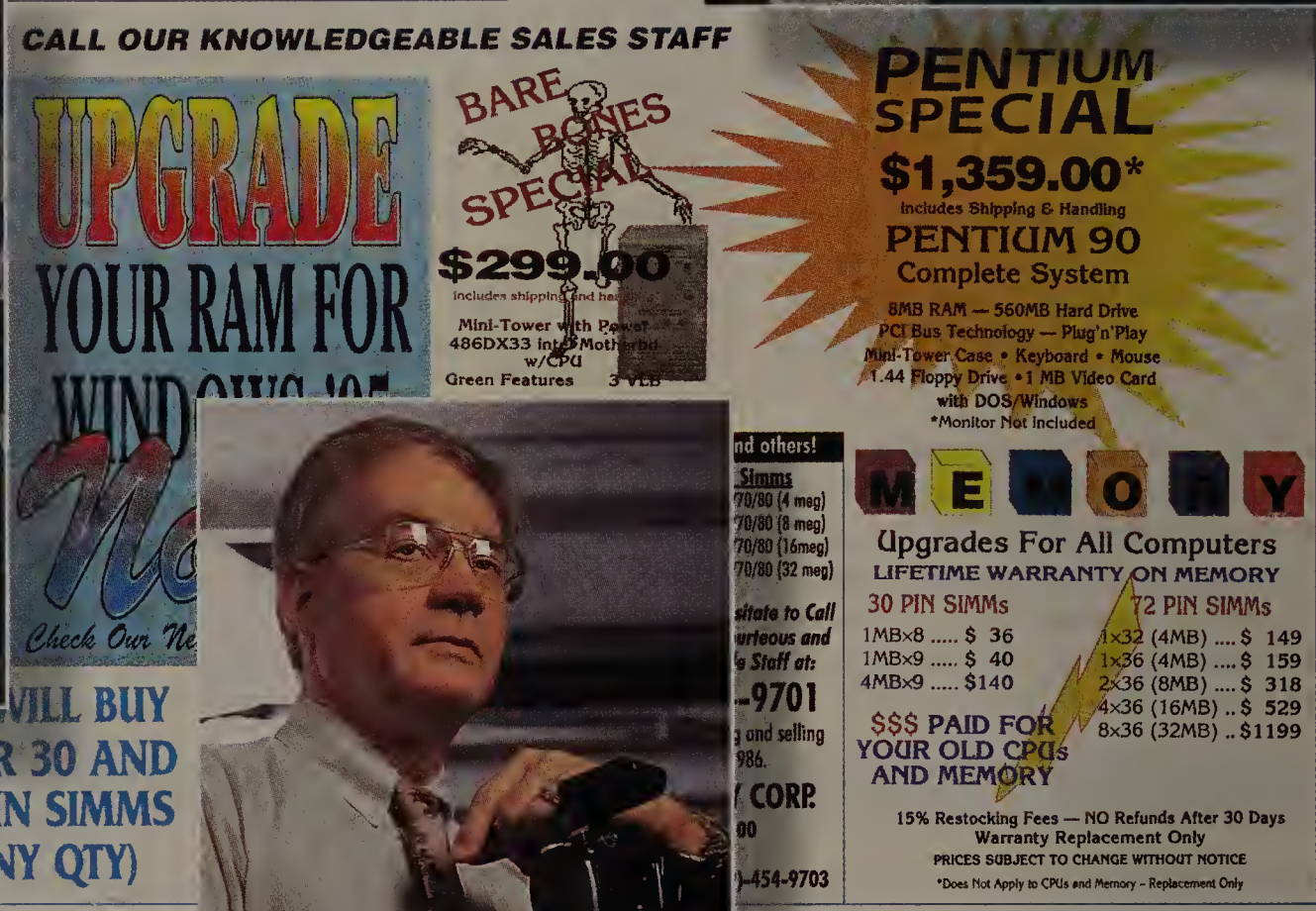
DIGITAL'S NEW SEARCH TOOLS: Digital Equipment Corporation plans to ship a new line of search products based on its speedy Alta Vista Web search technology. The first product, Alta Vista Search, will let you keyword search PC files and HTML documents on the Web or on your company's Intranet. Two suites, Alta Vista Intranet Solution and Alta Vista Cyberworker Solution, should help companies implement and manage Intranets and connect telecommuters and branch offices to them. Digital plans to ship the products later in the year; prices were unavailable at press time. —L. M.

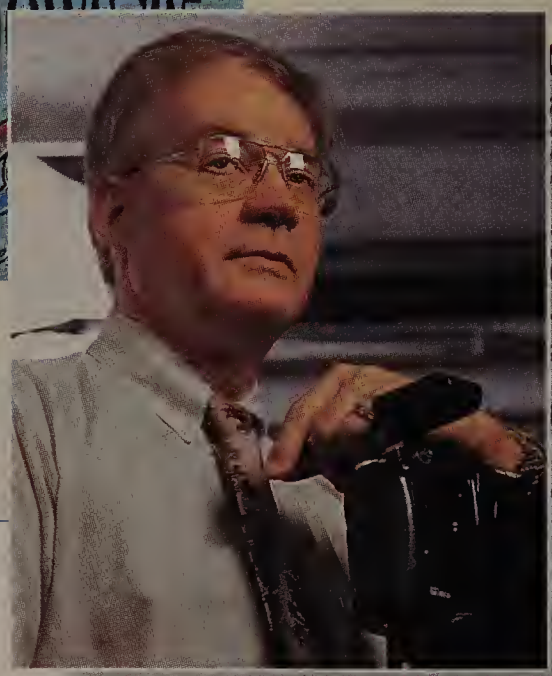
TIDBYTES: Gateway 2000 is selling systems directly from its Web site (http://www.gw2k.com). While other vendors offer information and a toll-

(continued on page 49)

JEFFREY PELO

RAM Scam!





RIPPED-OFF CUSTOMERS spurred PC World to investigate mail-order memory brokers. Clockwise from upper right: Morley Friedell, Howard Lower, and Andrew Thompson.

When Howard Lower bought an 8MB SIMM from Nevada Computer in April 1995, he thought he was getting a deal. But the $318 SIMM was defective, and when he called to get his money back, he was told the Boulder City, Nevada, mail-order firm had been sold. Lower, a photographer in Rochester, Minnesota, returned the SIMM to the firm's new owners and waited for his refund. It never came.

Last July Andrew Thompson, manager of a car dealership in Jacksonville, North Carolina, sold $400 worth of old SIMMs to Windows Memory Corporation, a memory broker in La Jolla, California. He delivered the RAM but never got any cash.

Last August Morley Friedell bought a Pentium-90 PC from Advanced Micro Solutions for only $1359. But when the Stevensville, Montana, retiree opened up his new system, he found a "disaster" of disconnected cables, defective drives, and missing parts. When Friedell tried to contact AMS, the Newport Beach, California, company was gone—and so was his money.

These are not your usual tales of mail-order distress. The difference? All the companies are linked by a common thread.

In the past year *PC World* has received nearly 40 complaints against five mail-order memory brokers in Southern California and Nevada alleging that the companies accepted payment or trade-ins and delivered defective products—or nothing at all. All five firms have now gone under, leaving banks, suppliers, and customers in the lurch. And all these firms can be traced back to one man: Don Royal Smith.

For years, Smith and his associates have operated businesses that walk a fine line between poor management and outright fraud. The total losses will likely never be known, but four of the five firms left unsecured debt totaling well over $1 million.

"These guys just have no scruples whatsoever," says a former business associate, who asked to remain anonymous. "Their attitude is, 'If you're dumb enough to let us screw you over, it's your problem.' "

The story is far from over. Smith is now under investigation by the U.S. Secret Ser-

PHOTOS, CLOCKWISE FROM UPPER RIGHT: GEOFF MANASSE, STEVE WOIT, DONNA BISE

vice, and *PC World* has uncovered several new mail-order firms being operated by Smith, his family, and former employees.

Modus Operandi

All the firms linked to Smith follow similar patterns. They take out ads in computer magazines (including *PC World*), buy supplies, and set up shop. Some people receive products as promised, but others aren't so lucky. When customers turn up the heat, the firms relocate, change their names, switch owners, or shut down. Sometimes the new owners are the same people using various aliases. Then the cycle begins all over again.

Rolphe Reinhart, a retired physician in Fountain Valley, California, got caught in one of these cycles back in August 1994, when he purchased 192MB of RAM from California Memories Plus. According to Reinhart, employees at the Tustin, California–based company insisted that he pay by check. After repeated efforts to obtain his memory, months later Reinhart still didn't have the SIMMs he'd paid for.

When Reinhart went to the company's headquarters in November 1994 to resolve the situation, he found the office cleared of furniture and the electricity turned off. Reinhart says owner Marty Shappard told him the firm had been purchased by Sunwest Micro of Las Vegas.

PC World was unable to verify the sale to Sunwest Micro or locate its alleged owner, William Dillstrom. In April 1995 California Memories Plus filed bankruptcy, with over $400,000 of debt. Marty Shappard had moved to Nevada, and Reinhart—one of seven *PC World* readers burned by the company—was out more than $13,000. (*PC World* is also listed as an unsecured creditor in the bankruptcy proceeding.) Records show that Sunwest closed in October 1995.

The person posing as Marty Shappard was Don Royal Smith. A handwriting analyst hired by *PC World* examined several public filings signed by Shappard and Smith and concluded the writing was from the same person. The Secret Service has also confirmed the alias, but refused to disclose further details about its inquiry.

When *PC World* tried to reach Smith for comment, we were called by attorney Daniel Casas of Orange, California, who said he advised Smith not to speak with *PC World*. "California Memories Plus did millions of dollars of business," Casas says. "Six or seven complaints is not a large number for that volume of business."

California Memories Plus went out of business, but Smith didn't. In September 1994 he started a new firm in Boulder City, Nevada, called Z-Memory Experts. *PC World* has not received any complaints against the company.

PC World has received nearly 40 complaints against mail-order firms that all trace back to Don Royal Smith.

However, Detective Robert Baughman of the Boulder City police says ten consumers have filed complaints with his office against Z-Memory alleging that it issued bad checks or failed to pay for memory. These people have lost a total of at least $20,000 to Z-Memory, the detective estimates.

Baughman says criminal charges have not been filed against Smith because he is "paying back his victims little by little" through the district attorney's bad-check unit. But, Baughman adds, by manipulating the legal process, Smith is "making fools of me and the DA's office."

Like Father, Like Sons

Smith and his associates typically buy companies with solid reputations, transfer control of the firms between family members, and use front people to disguise ownership. The story of Nevada Computer and Pacific Coast Micro is a classic case.

In May 1995 Donald Piper ordered $510 worth of RAM from Nevada Computer.

Breaking News

(continued from page 47)

free number, Gateway lets you specify a custom configuration on the site, then order the PC with a credit card... MSN on the Net: For $6.95 a month or $39.95 a year, you can access the content of the Microsoft Network through any dial-up Internet service provider you choose. The $39.95 offer expires August 31...Cradle-to-Grave E-Mail: A new service from USA.Net called NetAddress provides you with an e-mail address that will follow you anywhere in the world. The firm sets up a virtual post office apart from your Internet service provider, so no matter how often you change ISPs, your address stays the same. USA.Net will forward mail to a personal or work account and will even screen your messages. Prices range from $18 to $36 a year...Internet Tax on Hold: The Internet community in Florida has managed to fight off a proposed Internet usage tax—for now. The state legislature passed a bill in early May that would delay for a year the Department of Revenue's planned 7 percent levy on Net services while an appointed commission further studies the issue ...Scanner Price Breakthrough: Plustek USA is selling a new 24-bit color flatbed scanner with 300-to-600-dpi resolution for only $370, including a bundled OCR package and image editing software. At that price, the OpticPro 4800P makes photo-quality scanners nearly as affordable as monochrome models.

JEFFREY PELO

The memory never arrived, but Piper's credit card bill showed a charge to Pacific Coast Micro in San Diego. When Piper phoned PCM, an employee said the firm was handling Nevada's credit card sales, but denied any further affiliation and refused responsibility for Piper's order.

Piper, a music teacher in Kendalia, Texas, was shuttled between the two companies for six weeks. Each time he called, he was given the same series of excuses. Then, sometime in the fall of 1995, both firms shut down. Confidential sources say PCM left debts of more than $500,000.

Because Piper ordered by credit card, he didn't lose any money. But he wasn't the only victim: From January through November 1995, *PC World* received nine similar complaints against Nevada and PCM.

The links between these two companies are shrouded in confusion and contradiction. Nevada's founder, Kirk Frantz, says he sold his company to Pacific Coast Micro in May 1995. Public records list PCM's owner as Craig Johnson of San Diego. (*PC World* was unable to locate Johnson for comment.) But independent sources say the company was actually operated by Don Smith Jr., who used the alias Jack Smith to avoid being associated with his more famous father.

Don Smith Jr. denies any ownership interest in PCM and claims he purchased Nevada Computer himself, operating it as a separate business entity until it went under. Smith Jr. does admit that PCM helped Nevada handle some of its credit card transactions before both firms failed. "I never intended to defraud or hurt anyone," Smith Jr. says. "My problem is that I was undercapitalized."

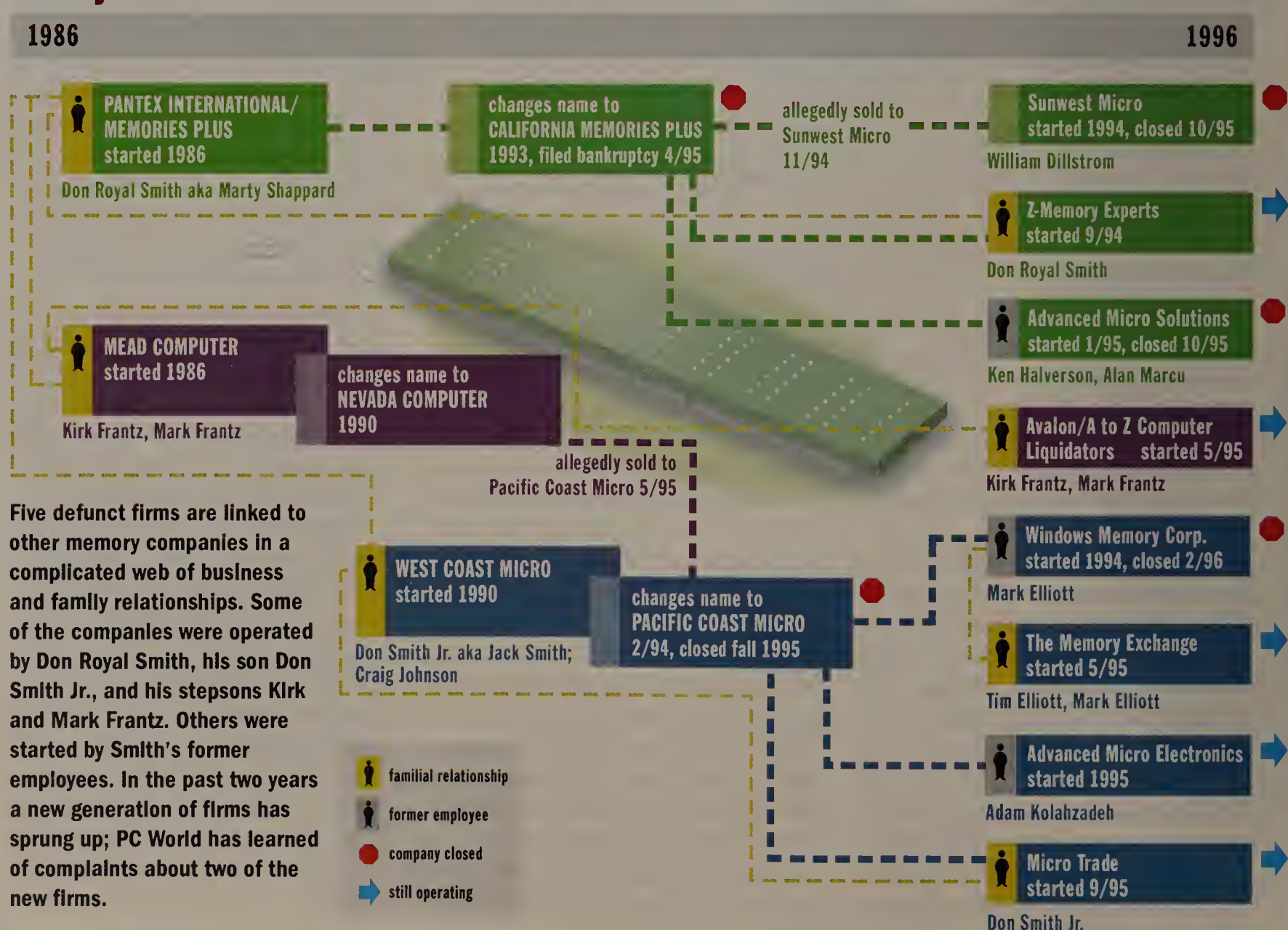
But readers report that the same employees answered the phone at both companies. And the connections run even deeper. Several sources—including Don Smith Jr.—say that Kirk Frantz is Don Royal Smith's stepson. Frantz, however, denies any familial ties to the Smiths.

The Next Generation

Two of the failed firms *PC World* investigated were run by former employees of the Smiths, though we found no financial links between the firms and Smith.

One of the shorter-lived spin-offs was Advanced Micro Solutions, owned by Ken "Boomer" Halverson and Alan Marcu,

Family Ties: RAM Brokers Share More Than Same M.O.



Five defunct firms are linked to other memory companies in a complicated web of business and family relationships. Some of the companies were operated by Don Royal Smith, his son Don Smith Jr., and his stepsons Kirk and Mark Frantz. Others were started by Smith's former employees. In the past two years a new generation of firms has sprung up; PC World has learned of complaints about two of the new firms.

both of whom worked at California Memories Plus. From January to October 1995, AMS sold systems, hard drives, and other components, as well as memory. During those ten months, *PC World* received 14 complaints about the firm.

Sources inside the company detail a variety of questionable practices at AMS, alleging that it mishandled funds and sold used and defective parts as new.

Owner Ken Halverson says that he "had no intent to defraud anybody. I [just] made some very bad business decisions." Halverson blames shipping problems for complaints about damaged goods, but admits that some customer orders may have slipped through the cracks when the company was going under.

"These guys are the godfathers of the industry," says a source. "They are *everywhere*."

Halverson says AMS owed $330,000 when it failed. "If I won the lottery, I'd give [people] their money back," he says. "But there are a lot of disappointments in life."

Pacific Coast Micro also produced its own spin-offs. In September 1995 *PC World* received the first of nine complaints against Windows Memory Corporation of La Jolla. The company was owned by Mark Elliott, a former PCM employee.

Mark Nadasdi, a systems engineer in New York City, sent 73MB of SIMMs worth $1703 to Windows Memory but never got any money back. "They've never returned a call," he says. "I'd speak with the same people, but they'd give me different names."

Windows Memory Corporation closed in February 1996, leaving a trail of unhappy customers and, according to Elliott, outstanding debts of $150,000. "I'm not the kind of person to rip anyone off," he says. "I'm very committed to getting my debts paid off."

Consumers who are owed money by Windows Memory should contact the company's attorney, Mitchell Sussman of Palm Springs, California, at 619/325-7191.

The Dons of Mail Order

The Smiths' influence on the mail-order memory industry can't be denied. An associate estimates Don Royal Smith alone has started "24 or 25 companies" in the last 15 years. "These guys are the godfathers of the industry," says an executive who's done business with several of the firms. "They are *everywhere*."

As a result, some companies with good reputations also trace their roots back to Smith. One such company is First Source of Aliso Viejo, California. Two of its three founders worked at the now-defunct Unitex in the late eighties, where Don Royal Smith was general manager. In 1990 the partners branched off to start First Source. Last year it reached $65 million in sales and began selling a wider range of computer components. *PC World* has not received any complaints against First Source.

Other active companies also link back to the Smiths. Although many are owned or operated by people involved in the five defunct firms, we have not found evidence of fraudulent or sloppy business practices.

Don Smith Jr. now owns and operates Micro Trade in San Diego. The Better Business Bureau of San Diego gives the firm a satisfactory rating. Kirk Frantz's brother Mark owns Avalon Micro and the related A to Z Computer Liquidators, both in Boulder City; Kirk is a principal. And Mark Elliott joined his brother Tim at The Memory Exchange in San Diego after Windows Memory folded in February. At press time *PC World* had not received any complaints against these companies. When we bought RAM covertly from Avalon and Memory Exchange it arrived with no delay.

A reader complaint pointed us to Advanced Micro Electronics in San Diego. Insiders say owner Adam Kolahzadeh is a former employee of Pacific Coast Micro, but Kolahzadeh vehemently denies any connection to the Smiths or to the similarly named Advanced Micro Solutions.

Skirting the Law

Consumer fraud is hard to prove. Postal Inspector Tom Taylor in San Francisco says authorities must "show specific intent to defraud" through a trail of evidence like inventory records, receipts, and tax returns. When firms move often, change names, or are purchased, the paper trail gets harder to follow. Local or state agencies can pursue the case only within their own jurisdiction. And without a large number of complaints, local authorities are unlikely to forward problems to federal agencies that can pursue large-scale investigations.

When a firm ships some of its orders and honors at least some of its promises, the "good faith" of its proprietors is hard to determine. Authorities may give firms the benefit of the doubt—which can give fraudulent operators time to disappear and pop up elsewhere. (For tips on protecting yourself, see this month's *Consumer Watch*.)

Despite the risks, a surprising number of consumers who've been burned say they'll continue to buy products through the mail. But these days, says music teacher Piper, "I'm a lot more careful."

—Angela Freeman and Daniel Tynan
with additional reporting by Christina Wood

If You've Been Burned

Here's how to fight back. Call your local police and contact the following:

***PC World* Consumer Watch**
501 Second St. #600
San Francisco, CA 94107
pcwcwatch@aol.com

U.S. Postal Inspection Service
Fraud Complaint Section
222 S. Riverside Plaza #1250
Chicago, IL 60606

Direct Marketing Association
Consumer Complaints Mail Order Action Line
1111 19th St. NW #1100
Washington, DC 20036

O'Hare Airport: 4.3 miles of terminals.

Dallas/Ft. Worth: 4.8 miles.

Denver International: 3.2 miles.

(It occurred to us you might want a lighter notebook.)

intel inside pentium PROCESSOR

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Of course, it also occurred to us that you don't want to lose features while losing weight. Thus, the new AcerNote™ Light notebook computer offers a Pentium® processor, full-size keyboard and large 10.4" color screen.

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- Large Full-Size Keyboard
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- *Double your RAM to 16MB for only $299*

$1999

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(It also occurred to us you might want other options.)

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- 10.4" Active Matrix Color Display
- 16MB RAM (40MB Max)
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- 5.8 Pounds
- Duracell® NiMH Battery
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- 2 Type II/1 Type III PCMCIA Slots
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- 16MB RAM (40MB Max)
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- 256KB L2 Cache
- 6.5 Pounds
- Dual Battery Operation ***(Second Battery Free with Purchase)***
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- 16-bit Sound Blaster™ Compatible Audio
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AcerNote Pro
120MHz Pentium Processor

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- 24MB RAM (40MB Max)
- 1GB Hard Drive
- 256KB L2 Cache
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- Dual Battery Operation ***(Second Battery Free with Purchase)***
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- 2 Type II/1 Type III PCMCIA Slots
- 16-bit Sound Blaster™ Compatible Audio
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- 3-Year Limited Warranty/ 1-Year Rapid Repair
- ***28.8 Modem Included***

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120MHz Pentium Processor

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- 1GB Hard Drive
- 256KB L2 Cache
- 6.5 Pounds
- Dual Battery Operation ***(Second Battery Free with Purchase)***
- 1MB Video DRAM
- 2 Type II/1 Type III PCMCIA Slots
- 16-bit Sound Blaster™ Compatible Audio
- Touchpad with Ergonomic Palmrest
- 3-Year Limited Warranty/ 1-Year Rapid Repair
- ***28.8 Modem Included***

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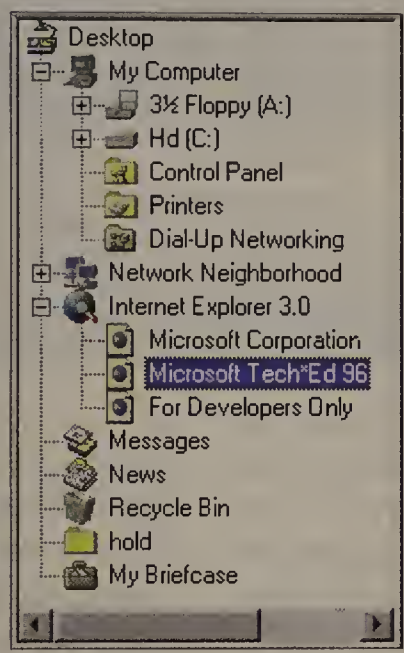
Please call 1-800-574-ACER for details on the limited warranty. Return shipping and insurance charges are the responsibility of the customer. Not available outside U.S. Producrs, availability, prices and programs are subject to change or cancellation without notice. Shipping and handling charges are extra. Acer and the Acer logo are registered trademarks and AcerDock and AcerNote are trademarks of Acer America Corporation and Acer Inc. The Intel Inside logo and Pentium are registered trademarks of Intel Corporation. All other brands and product names are trademarks or registered trademarks of their respective companies. © 1996 Acer America Corporation.

Windows NT 4.0 Moves Closer to Mainstream

Microsoft's road map for Windows 95 and Windows NT shows the two operating systems drawing closer together in the near future. Microsoft aims to ship the next version of NT this summer, but has no plans for a Windows 96. Rather, the company will release a series of minor upgrades and add-ons for Windows 95 this year that add up to a sort of Windows 96 junior. The next major update of Win 95, code-named Memphis, won't appear until 1997 or early 1998.

Although the new 4.0 release of NT gains Windows 95's user interface, it will likely remain a high-end choice. It still requires more system resources and supports fewer hardware options. The latest revelation from Microsoft is that NT 4.0 won't install cleanly on top of existing Win 95 setups: Migration will require reinstalling applications and recreating preferences and desktop settings.



ALL-IN-ONE EXPLORER with PageView shows Internet data and local files on the same tree.

Increments for 95; a New Look for NT

The next step for Windows 95 is a code update set for release to PC makers this summer. It will include the 3.0 release of Internet Explorer and a new 32-bit version of the File Allocation Table file system that supports larger drives and uses disk space more efficiently. FAT32 will be made available at no cost to end users shortly afterward.

In the fall Microsoft plans a retail add-on (along the lines of the Plus pack) that contains a revamped Explorer, a new personal information manager, and Internet Explorer 3.0. Explorer's new PageView mode lets you use a single interface to browse files stored on your PC and LAN as well as on the Net.

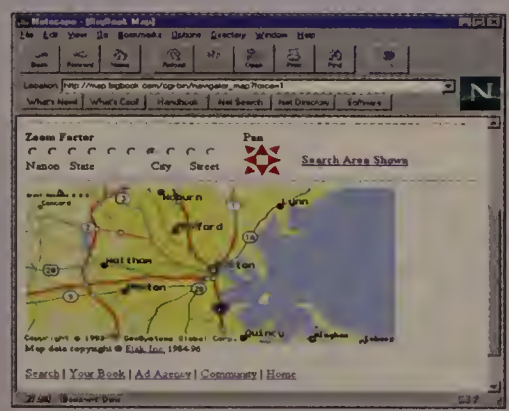
The 4.0 release of Microsoft's high-end Windows NT operating system marries Win 95's ease of use to NT's security, stability, and support for multiprocessing and non-Intel-compatible CPUs. Microsoft says the NT kernel has been extensively rewritten to improve performance and curb memory requirements. We didn't receive a copy of the latest beta in time to test it.

Some of the special programming interfaces supported by Windows 95 finally migrate to NT in the 4.0 release, but others haven't yet made the leap. NT 4.0 has the DirectX graphics and multimedia APIs and the TAPI telephony interface, which supports voice/data/fax applications. NT versions of the Direct3D API and the successor to the Video for Windows player, called ActiveMovie, will appear later in the year, Microsoft says. NT 4.0 is slated to include Explorer's new PageView mode. The new release also comes with an Exchange messaging client, but the Microsoft Fax portion of Exchange (familiar to Windows 95 users) is missing in action.

Unfortunately, NT 4.0 doesn't support Plug and Play technology for self-identification and self-configuration of system hardware; Microsoft says Plug and Play won't make it into NT until the "Cairo" release scheduled for late 1997 or early 1998. NT 4.0 also has fewer available drivers, so it doesn't work on the wide variety of PCs and peripherals supported by Win 95. This situation should improve when

The Web Browser Let Your Mouse Do the Walking

My 2-inch-thick *Pacific Bell Smart Yellow Pages* has 57,000 business listings. But the big book is starting to look small compared to massive white and yellow page sites popping up on the Internet. The reigning champs among online business directories are Yellow Pages Online (http://www.ypo.com/) and Nynex's BigYellow (http://s18.bigyellow.com/), each with upwards of 16 million listings. BigBook (http://www.bigbook.com/), which contains a mere 11 million entries, has a clever map tool that helps you find a business anywhere in the United States, even if you forgot its name. If you're looking for a person, the Four11 White Page Directory (http://www.four11.com/) contains 6.5 million e-mail addresses. (My defunct 3-year-old address is among them, however, so there's no freshness guarantee)...Yahoo borrows the Four11 listings for its People Search service (http://www.yahoo.com/search/people/phone.html), which lets you query from among 90 million addresses, phone numbers, and Web pages. Compared to my Pacific Bell directory, that's quite a phone book. —Richard Overton



FIND LOCAL BUSINESSES on the BigBook Web site by pointing to areas you want to search and then refining your query.

Microsoft ships a planned common device driver model for both flavors of Windows.

The future of NT is closely tied to networks. In a dramatic shift, Microsoft has moved away from its own proprietary technologies, such as NetBEUI and the WINS domain-name protocol, in favor of Internet standards such as TCP/IP and DNS. (The old protocols will still be supported for backward compatibility.) Both the workstation and server versions of NT 4.0 include bundled Web authoring tools; the server edition also ships with Microsoft's graphical Internet Information Server.

Installation Gap

Microsoft admits to a serious weakness in Windows NT 4.0: When installed onto a Windows 95 PC, it won't inherit the previous operating system's applications, user preferences, and desktop settings. So you have to put NT into a different directory and then reinstall your apps from scratch. "It's a travesty," says none other than Jim Allchin, senior vice president of Microsoft's desktop and business systems division.

WINDOWS NT AND 95 ROAD MAP

	Summer 1996	Fall 1996	Winter 1996 to 1997	Winter 1997 to 1998
Windows NT	Windows NT 4.0 Windows 95 user interface Explorer with PageView DirectX and TAPI Exchange messaging client Web authoring			Cairo object-oriented file system Plug and Play power management Windows driver model clean install over Windows 95
Windows 95	OEM refresh driver updates bug fixes FAT32 Internet Explorer 3.0	Internet add-on Internet Explorer 3.0 Explorer with PageView Web authoring Athena PIM	Service Pack 2 Windows driver model bug fixes	Memphis improved graphics engine object-oriented file system

The problem stems from differences between the Registries in Windows NT and 95. Although both operating systems can run the same 32-bit programs, many programs execute different code (such as alternate .dll files) or install themselves differently depending on which Windows is in use. Since Microsoft couldn't make migrating from 95 to NT a seamless process, Allchin says, it decided against a half-baked solution. The version of NT that follows 4.0 will install cleanly over Win 95 systems, he says. Excusing the problem with mock humility, he quips: "Yes, we're incompetent, but it's the right thing to do."

—Scott Spanbauer

Bug Watch Windows 95's Slow Memory Leak; Symantec Patchwork

Microsoft Darns Hole in Windows 95 Winsock

▶ **Bug:** Running Web browsers, e-mail programs, and other apps that use Windows sockets to communicate over the Internet for several hours at a time can gradually decrease available system memory, slowing down your Win 95 system or even causing it to crash. This memory leak becomes worse if programs open and close multiple winsock connections.

▶ **Fix:** A patch to the Windows 95 kernel corrects the winsock problem. You can download krnlupd.exe from Microsoft's Web site (http://www.microsoft.com/windows/software/krnlupd.htm).

In Brief: A Trio of Fixes for Symantec Products

▶ **Norton Navigator 95.0.b.** Symantec's second patch for Norton Navigator (see January's *Bug Watch* for the first) further speeds launching and file operations, integrates the QuickView file viewer into Norton File Manager, and makes FileAssist work with Microsoft Office 95. You'll find separate patches for both the 1.0 version of Norton Navigator (1-to-95b.exe) and the later 95.0.a (a-to-95b.exe) on Symantec's FTP server (ftp://ftp.symantec.com/public/win95_nt/navigatr/) and BBS (541/484-6669), and on CompuServe (go symantec) and AOL (keyword symantec).

▶ **pcAnywhere32 update.** This patch should speed up 16-bit apps running remotely under Win 95. It also eliminates an amazing bug in early versions of pcAnywhere32 under Windows NT: If you launched the program inst32.exe, every file on your hard drive would be erased. (Don't try this at home—take our word for it.) Find the upgrade, 70up_a.exe, on Symantec's FTP server (ftp://ftp.symantec.com/public/win95_nt/PCA32/) and on CompuServe and AOL.

▶ **Winfax Pro 7.02.** An updated version of Symantec's (formerly Delrina's) fax software boosts speed and fixes glitches, including system freezes when faxing from certain applications and problems reading phone books and fax archives made with previous versions. You can download the patch in three files (wf702d1.exe, wf702d2.exe, and wf702d3.exe), totaling more than 3MB, from the Symantec/Delrina group FTP server (ftp://ftp.delrina.com/pub/patches/windows95/winfaxpro70/), or from CompuServe or AOL. —Scott Spanbauer

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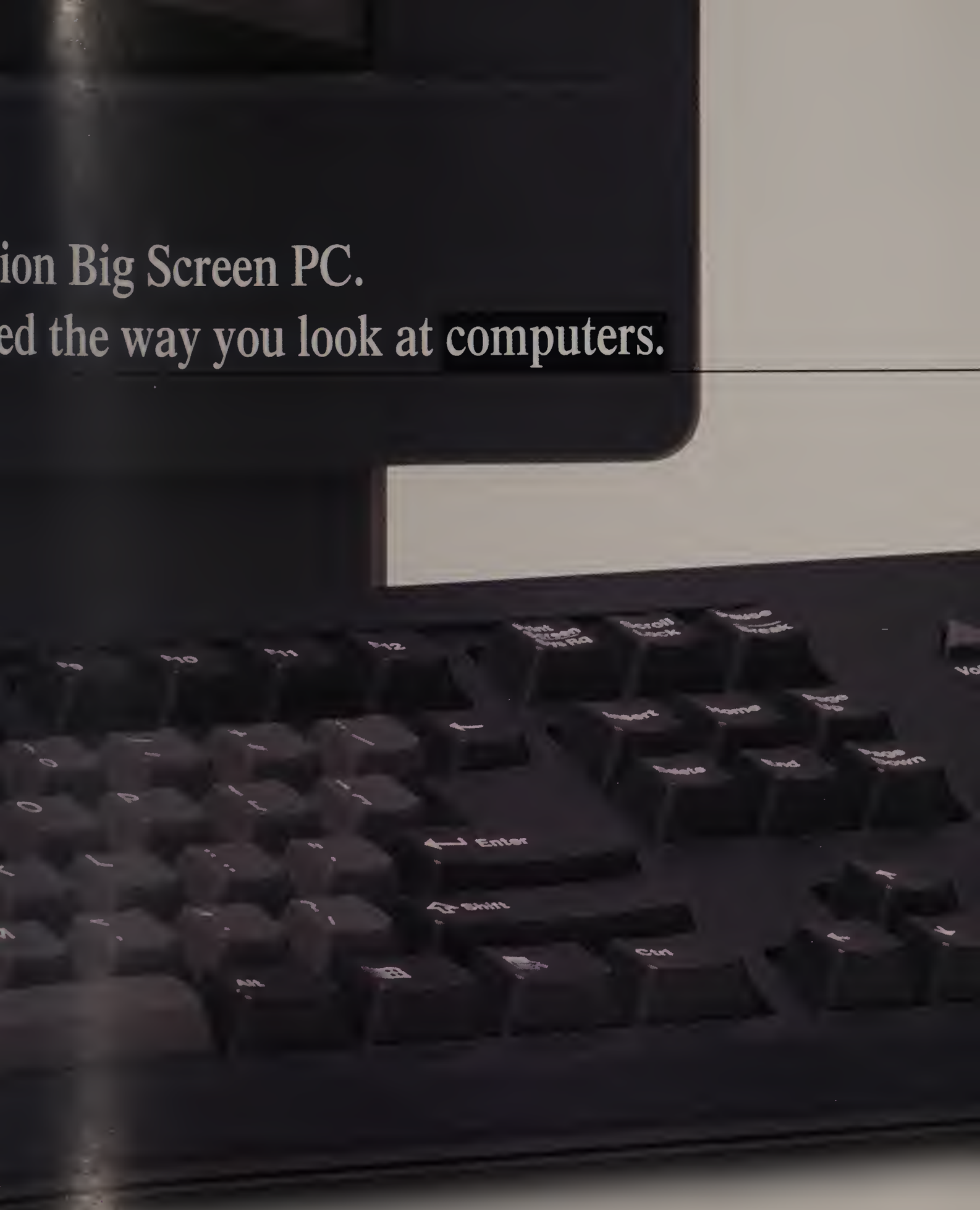

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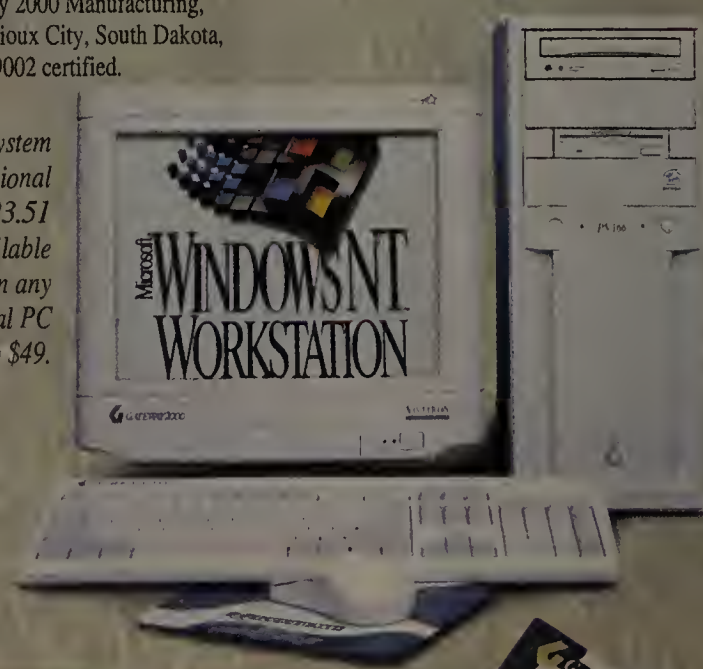

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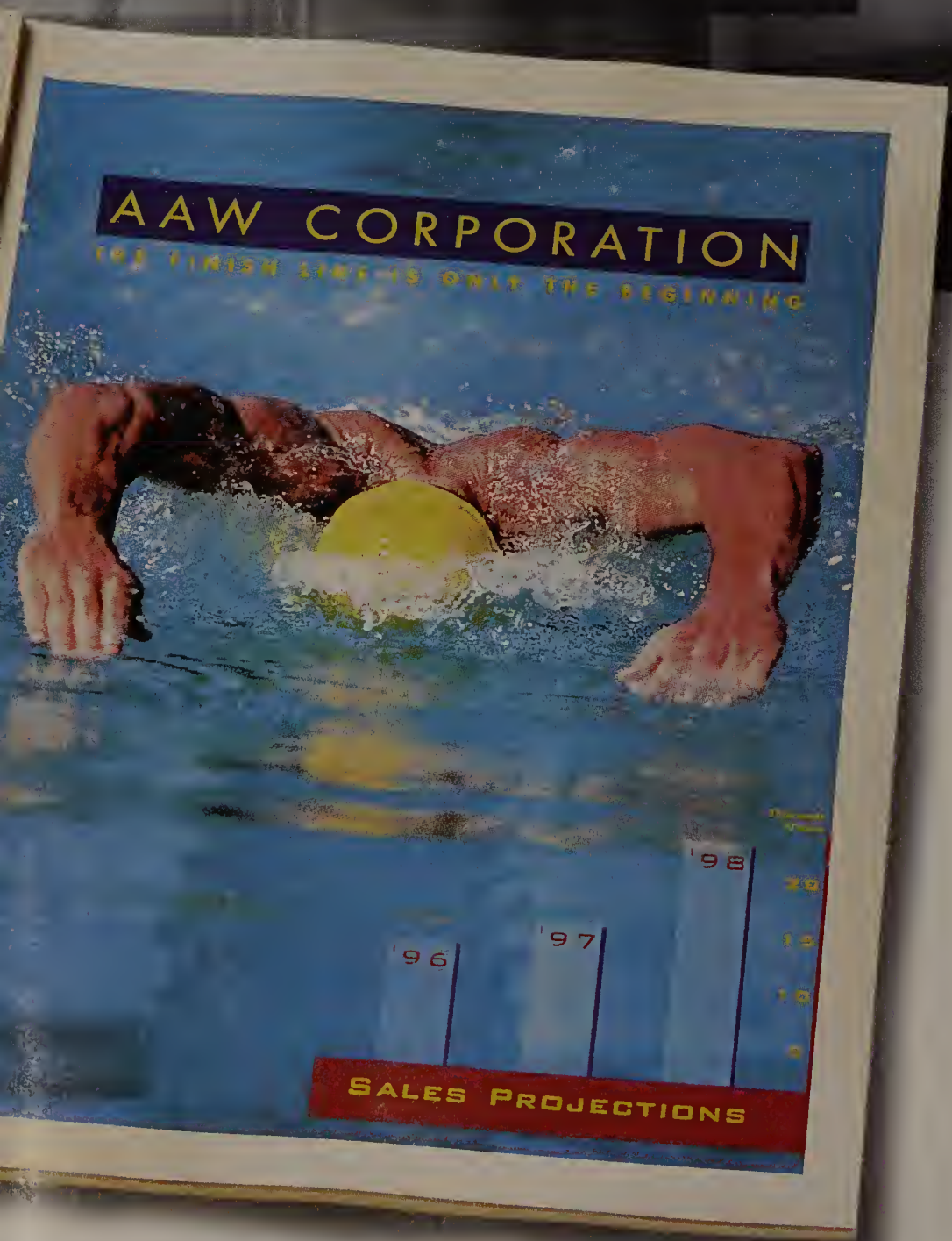

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IBM's ThinkPad Slims Down, Beefs Up

Thin and wide is this year's notebook fashion trend. The latest portable PCs, such as IBM's new ThinkPad 560 and expected releases from Compaq and NEC Technologies, measure just over an inch thick and weigh a mere 4 pounds, yet they feature the same full-size keyboards and large LCD screens found in larger notebooks. At long last, computer vendors have realized that business users don't want smaller notebooks with cramped keyboards and tiny screens, but *lighter* portables that won't wrench their backs when they're racing through airport terminals.

Out of the carton, the IBM ThinkPad 560's most striking feature is its svelte design—this aerobicized portable is slim enough to fit in the most cramped briefcase. (We examined a prerelease unit.) Open the notebook, and you're in for another pleasant surprise: The spacious keyboard features 85 keys (including separate keys for <Page Up>, <Page Down>, <Home>, and <End>), an integrated palm rest to reduce wrist strain, and IBM's TrackPoint pointing device. Don't expect perfection, however; some keys (such as the row of function keys) are half-size and might be a tad small for touch typists with stubby fingers.

The ThinkPad 560 also has a large LCD color screen: You can select an 11.3-inch dual-scan or a 12.1-inch active matrix display. The larger screen offers wider viewing angles—helpful if you use the ThinkPad for presentations—but both screens support resolutions up to 800 by 600, making these portables reasonable alternatives to desktop PCs.

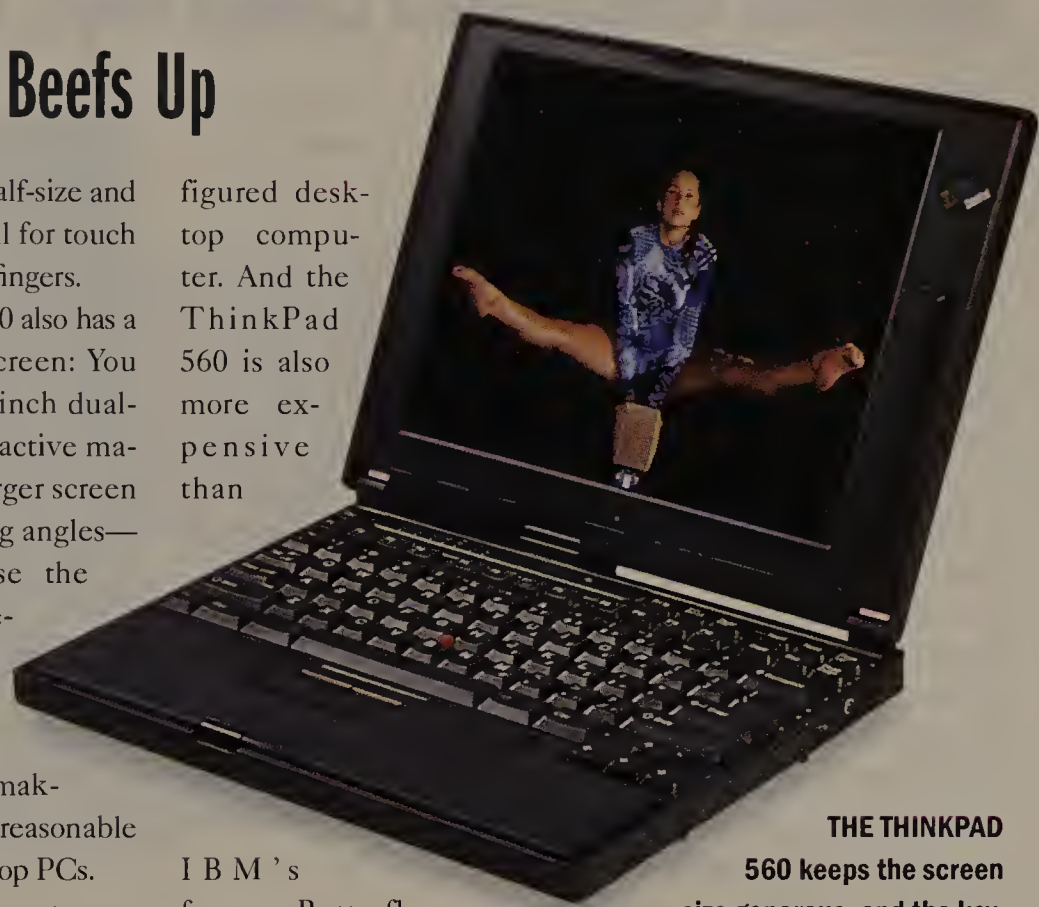
But don't throw out your minitower just yet. IBM's engineers had to make some compromises to achieve the ThinkPad 560's slender design, including resorting to an external floppy drive that connects to a dedicated port on the notebook's left side. The machine also lacks an internal CD-ROM drive, although you can connect an external unit from a third-party vendor to either the parallel port or one of two PC Card Type II slots. And while the ThinkPad 560 includes an IrDA-compatible infrared port for transferring files to and from infrared-equipped desktop PCs, there is no docking station for easy hookups to the office local area network. But you can connect to a LAN by installing an ethernet card in one of the PC Card slots.

Another issue is price: A ThinkPad 560 with a 100-MHz Pentium processor, 8MB of RAM, and a 810MB hard drive costs $2699—which is much higher than a similarly configured desktop computer. And the ThinkPad 560 is also more expensive than IBM's famous Butterfly subnotebook, the ThinkPad 701C. When IBM first shipped the ThinkPad 701C, with its expandable keyboard, subnotebooks seemed like the ideal replacements for bulky, heavy notebooks. But the subnotebooks' petite size means that their screens are too small to be useful. IBM is replacing the ThinkPad 701C altogether with the higher-powered, big-screen ThinkPad 560 and recently slashed the price of the 701C to just $1499.

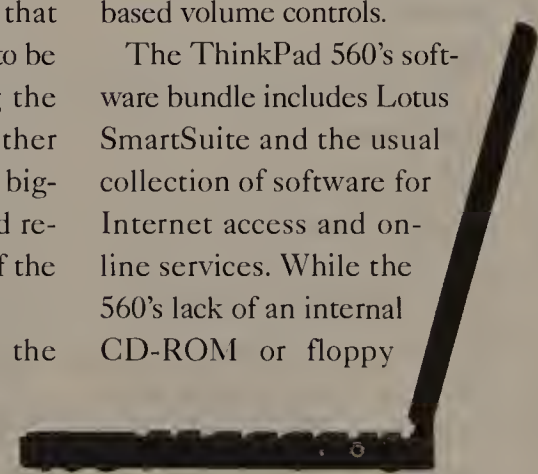
IBM maintains that the ThinkPad 560's lithium-ion battery powers the notebook for about 3 hours between charges, a claim that held true during our field tests of a preproduction unit. The included petite AC adapter is roughly the size of a pack of cigarettes, with a 9-foot–plus power cord that's long enough to reach those AC outlets hidden in the dark corners of hotel rooms. The ThinkPad 560 also has built-in audio and jacks for external speakers and a microphone. It even has a volume dial, which is easier to use than software-based volume controls.

The ThinkPad 560's software bundle includes Lotus SmartSuite and the usual collection of software for Internet access and online services. While the 560's lack of an internal CD-ROM or floppy drive keeps it from being the ideal desktop replacement, its light weight, ergonomic features, and aggressive price make it an excellent portable PC for business travelers with bad backs and limited budgets.

—Jeff Bertolucci



THE THINKPAD 560 keeps the screen size generous, and the keyboard is spacious enough to be comfortable for touch typists.



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QuickVideo Capture Board Creates Small, Portable Video Files

Want to show Grandma a movie of little Johnny's first steps without having to mail her the videotape? A new video capture card and compression technology from Alaris let you create compressed, full-motion video files that can be played back without special hardware.

The QuickVideo Capture Board's proprietary compression technology enables capture of full-motion video—30 frames per second—at resolutions up to 320 by 240, a quality that surpasses streaming video technologies available on the World Wide Web today. The video is compressed on the board before being sent to your hard disk, reducing the file's bandwidth and required drive space: Once compressed, 30 seconds of video take up about .5MB. The QuickVideo also contains built-in audio capture and playback, circumventing the need for a sound card.

You can send self-playing Videograms through e-mail or over the Internet or a company network; they're small enough that a 60-second video clip fits on a 3½-inch floppy disk. As long as the person who receives it has a Windows PC (minimum 486DX2-66), they can run your Videogram by clicking on its file icon.

Sound easy? You bet. It took only a couple of minutes to create a Videogram. Friends who received it complained only that the sound quality was poor and not easily adjustable. And I was disappointed by the small Videogram window, which averages 4 inches square. If you increase window size, resolution weakens to the point of blurriness. Unless you are crazy about keeping in touch with far-away friends, it might be difficult to justify QuickVideo's price—$399—for the thrill of sending goofy video clips.

—Samantha Parent

VIDEOGRAMS DELIVER FULL-MOTION VIDEO and a run-time engine for one-click playback, via e-mail or over the Internet.

QuickVideo Capture Board

High-quality video with easy playback on most PCs.
Alaris
800/317-2348
Street price: $399
Reader service no. 693

Canon Multifunction Printers Outpace Competition

You won't need to kick the tires to see if Canon's new Convertables are a honey of a deal. These multifunction printers let you scan, copy, and fax documents. Our favorite of the two models, the MultiPass C2500, is a color ink jet printer—and will be the only product of its kind on the market. (Lexmark's costlier Medley will be phased out and unavailable after June.)

At $599, the MultiPass C2500 beats Hewlett-Packard's comparatively priced multifunction ink jets—the OfficeJet Model 330 ($579) and Model 350 ($599)—in value, as the HP units don't offer color printing and have slower print and fax speeds.

We didn't receive a MultiPass C2500 in time for formal testing, but Canon gave us a peek at a preproduction unit. The MultiPass measures 18.8 by 19 inches and is 14 inches tall, so it doesn't hog desk space; it also has a straightforward control panel on the front that's simple enough for kids to use. Its rated print speeds are 5 pages per minute in monochrome and less than a page per minute in color. The printer provides 720-by-360-dots-per-inch resolution—more than adequate for business work—and the input tray holds 150 sheets. It also handles envelopes and transparencies, and on the fun side, even fabric sheets and T-shirt transfers. A bundled Canon Creative 1.4 CD-ROM includes applications for family projects.

As for faxing, the unit provides 14.4-kilobits-per-second transmission speed. It works as a stand-alone fax machine or can be used for faxing from your PC. The C2500 receives and stores up to 42 pages in memory if paper runs out.

You can make up to 99 monochrome copies at a time at 360-dpi resolution—superior to the 200-dpi copies that most multifunction printers provide.

A monochrome Convertible, the MultiPass 800, will also be available for $499. It'll save you $100, but it's considerably slower, with 2-ppm printing and 9600-kbps faxing. And its input tray holds only 100 sheets of paper.

—Laurianne McLaughlin

Canon MultiPass C2500, 800

Multifunction devices outperform the competition.
Canon Computer Systems
800/848-4123
Street price: C2500 $599, 800 $499
Reader service no. 694

The Compaq LTE 5000 Can Be Anything You Want It To Be.

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Well, the LTE 5000 is completely modular, so you can mix and match capabilities however you like. You can add an optional QuadSpeed CD-ROM drive, an extra battery — or even an extra hard drive. Just plug your choice of interchangeable devices into the front-loading MultiBay,™ and the LTE 5000 is as flexible as you are — no matter where you take it.

Then, whenever you need it, you can add the optional MultiBay Expansion Base, with integrated Ethernet. You'll get two more MultiBays — for additional modular devices, and the ultimate mix of power and flexibility.

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*All prices shown are Compaq DirectPlus prices. Reseller prices may vary. Other models available, call for pricing. Call for lease prices. Leasing is provided for a term of 36 months and is subject to approved credit and certain terms and conditions. Call for details. Battery packs and certain options are covered by a One Year Warranty. The LTE 5000 is covered by a Three-Year Worldwide Limited Warranty. Offer available in the U.S. only. © 1996 Compaq Computer Corporation. All Rights Reserved. Compaq and the Compaq Logo Registered U.S. Patent and Trademark Office. DirectPlus is a registered service mark. LTE is a registered trademark and MultiBay is a trademark of Compaq Computer Corporation. Products, prices and programs are subject to change without notice. Other products are trademarks or registered trademarks of their respective companies. Pentium and the Intel Inside logo are registered trademarks of Intel Corporation in the U.S. and other countries.

Teac Tape1600: Low Cost, Big Backup

It doesn't take a rocket scientist to understand the benefits of backing up a hard drive. But with hard disks on new systems starting at 1.2GB, finding an affordable backup device of suitable capacity takes some searching. We examined a shipping version of Teac America's new internal Tape1600, which has a street price of $179. Its two-to-one compression on Travan TR-2 tapes yields a compressed capacity of 1.6GB, or 800MB uncompressed. Teac's Tape800 costs $30 less but uses TR-1 tapes and can provide only uncompressed storage of 800MB.

Initially my system couldn't find the Tape1600; and when I tested my floppy drive with a floppy disk, the disk turned out to be corrupted. (Eventually two other disks would be corrupted, but I don't know why.) After some adjustments the Tape1600 started working, and I was able to back up my hard drive. But then I had to disconnect the Tape1600 to secure it in its drive bay and close my computer's case. Once that was done, my system again failed to recognize the drive. After a couple of calls to Teac and a visit from a technician, I'm happy to say my backup drive is working fine.

However, the bezel that Teac provided for the cover of my minitower didn't fit: I had to jury-rig it with tape. And while the company provided two placeholders to widen the 3½-inch drive to fit my 5¼-inch bay, I had to drum up the rails to secure the drive.

I was told the installation process should have been easy, and considering the Tape1600's low price and 1.6GB of storage, I probably shouldn't complain too much. But installing it turned out to more of challenge than I'd anticipated.

—Gabrielle Mitchell

A REAL BARGAIN: Teac's Tape1600 internal tape backup drive can store up to 1.6GB of compressed data.

Tape800, Tape1600

Affordable tape backup drive had installation problems.
Teac America
213/726-0303
Street price: Tape800 $149, Tape1600 $179
Reader service no. 695

Creative Labs' New Graphic Boards a Bargain

The folks who put a Sound Blaster in virtually every PC are taking aim at another slot in your system. Creative Labs is entering the highly competitive video acceleration market with two boards based on chips from Cirrus Logic. The Graphics Blaster MA302 and Graphics Blaster MA202 were still in beta testing when we got our hands on them, but we liked the aggressive pricing and solid early performance.

The MA302, which uses the Cirrus Logic CL-GD5462 chip, is the first graphics board we've seen that uses a new type of video memory called Rambus DRAM. RDRAM's higher bandwidth allows more data to pass through at one time on the way to your monitor. While multimedia and 3-D applications will certainly benefit from the higher bandwidth, our early tests indicate that standard business programs won't run any faster with the MA302 than with currently available VRAM-based boards. Fortunately, the MA302 doesn't cost more than a VRAM board: At $199, it's a great value.

Like many leading low-cost graphics boards, the $149 Graphics Blaster MA202 uses EDO DRAM to deliver good performance in business applications while keeping the price down. Our preliminary tests show the board on a par with Top 10 bargains such as the STB Powergraph 64 Video (see Top 10 Graphics Boards).

Both boards support Microsoft's DirectDraw and DirectVideo, which means that compatible applications can take advantage of the boards' hardware acceleration to boost performance. DirectVideo did not work perfectly with the MA302, causing video clips to drop frames, but the company is working to fix this problem.

With these cards Creative Labs bundles a set of useful utilities called Blaster Control. The utilities add three tabs to the Windows 95 Display Properties box for centering images on your monitor, changing refresh rates, calibrating colors, and more. Overall, the Graphics Blasters are a good first effort from a household name.

—Brad Grimes

Graphics Blaster MA202 and MA302

Sound card leader enters the graphics market with two solid boards.
Creative Labs
800/998-5227
Street price: MA202 $149, MA302 $199
Reader service no. 696

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Guaranteed Protection against all power problems, on all power paths, for your PC and peripherals.

Back-UPS Office's compact design installs easily on desktop, floor, or mounts to wall. Its ninety-degree plug fits flush against the wall.

PC World 20 Best Upgrades

PC MAGAZINE UK EDITORS' CHOICE

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VISION AWARDS 10 BEST NEW PRODUCTS 1993 Resellers News

APC products have won more awards for reliability than all other UPS vendors combined.

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Integrates the Security of a Surge Suppressor with the Power of a UPS
Back-UPS Office provides enough outlets to protect your entire system. Six outlets guard your hardware with full time surge protection. Three of the six outlets provide instantaneous battery backup to keep your system from crashing in the event of a brownout or blackout.

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An LED signals when the Back-UPS Office's internal self-test finds the battery near the end of its life. You have 6-8 weeks replacement warning. Batteries typically last 3-6 years, and are user-replaceable.

Site-Wiring Fault Indicator
Without a proper ground, most surge protection is useless. Back-UPS Office alerts you to wiring problems such as missing ground and reversed polarity, two common wiring mistakes which otherwise would require an electrician's visit to diagnose.

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Back-UPS Office's built-in phone line/10 Base-T network cable surge protection prevents data line surges from damaging internal and external modems, motherboards, input/output cards, and other system components.

Bringing up the issue is awkward, but inevitable: You have a better chance of winning the lottery than of escaping power problems. Sooner or later, every computer user learns about surges, brownouts, spikes and blackouts. Unfortunately, most learn the hard way. Power problems are the single largest cause of computer data loss and hardware damage. If a power sag makes your modem drop the line while you're downloading a file from the Internet, or causes your keyboard to lock before you've saved work, you lose time, money and end up spending another late night at the office to meet your deadlines.

Only Back-UPS Office provides single device Multipath™ protection for all your equipment

The Multipath™ Power Protection Advantage	Traditional Surge Protector	Traditional UPS	Back-UPS Office
Protected Paths			
AC	•	•	•
Data			•
Phone			•
Total Outlets	4	2	6
Number of Block Outlets			2
Protection from			
Surges	•	•	•
Spikes	•	•	•
Blackouts		•	•
Brownouts		•	•
Typical Runtime in Minutes			
with Pentium 100 w/15" monitor		10	10
Battery backup for			
PC		•	•
Monitor		•	•
Storage Devices/Zip Drives		•	•
Full-time surge protection for			
Fax/Modem	•		•
Laser Printer	•		•
Speakers	•		•
Dataline protection for			
Internet or Network			•

Traditionally protecting all your equipment meant buying both a surge suppressor and a UPS. Even then only your AC line was protected. New Back-UPS Office protects all the paths to all your equipment.

Multiple peripherals and data lines to and from your system are vital, but dangerous. Without them, you can't do your job. However, plugging a phone line into your computer doubles your vulnerability to power problems; add any peripheral, and it triples. Even if your computer's AC power-line is shielded, when a surge hits an unprotected peripheral, it can blaze down serial and data lines, and toast your expensive PC.

Only Back-UPS Office provides true common ground protection

Figure 1

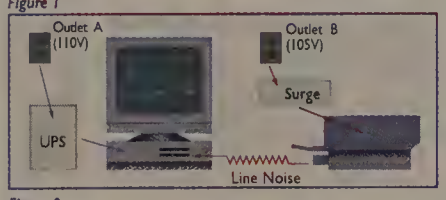

Figure 2

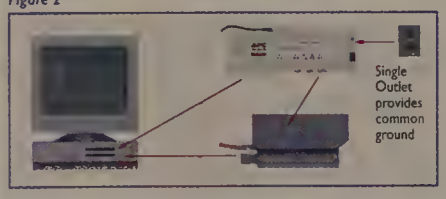

Figure 1: voltage differentials between multiple outlets create line noise and data glitches.
Figure 2: Back-UPS Office's common ground design eliminates the danger of voltage differentials.

Until now, protection for your entire system required several devices. But multi-device protection can leave you vulnerable to line noise and unwanted data glitches created by voltage differentials between outlets.

Back-UPS Office provides reliable, true common ground Multipath™ protection for your entire system. Instantaneous battery backup ensures uninterrupted operation of your CPU, monitor and external storage devices. Full-time surge suppression spreads a safety net around any remaining integrated peripherals, like modems, printers, speakers, and phone systems. Back-UPS Office's convenient BlockSafe™ outlet spacing handles all size plugs.

Back-UPS Office protection means true Multipath™ protection, clean, safe power to every peripheral, and instantaneous battery backup to keep your cutting edge system and O/S from crashing. It means protection for less by integrating the security of a surge suppressor with the power of a UPS, guaranteed up to $25,000.

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Circle 45 on reader service card

Quad-Speed too Slow? Plextor's 8Plex Spins Twice as Fast

Not long ago double-speed CD-ROM drives were the hottest thing in multimedia, delivering such cutting-edge enhancements as the ability to shovel data to the CPU at a blistering 300 kilobits per second. PC users rejoiced: Suddenly you could play video clips (albeit tiny and blurry ones) from a CD-ROM.

How quickly times change. Today, six-speed CD-ROM drives are the norm—even on entry-level PCs—and drive manufacturers keep upping the performance ante. For instance, Plextor's new 8Plex, an eight-speed CD-ROM drive, transfers data at up to 1.2 megabits per second, according to the company.

List priced at $399 internal and $499 external, the 8Plex is targeted at graphics professionals willing to pay top dollar for breakneck speed. In addition to its ultrafast data transfer rate, the 8Plex features a 256K cache for storing data that the drive is most likely to need next. It comes with SCSI and audio cables for connecting the drive to your computer. Plextor also sells a variety of 8Plex drive kits with SCSI boards.

Although installing a SCSI CD-ROM drive can be tricky (particularly for DOS and Windows 3.*x* users), the 8Plex's documentation does a fine job of guiding you step-by-step through the procedure. I installed a preproduction 8Plex drive on a 166-MHz Pentium running Windows 95 and encountered few problems; Windows 95 automatically detected the PCI SCSI bus controller and prompted me to install the required drivers, which are supplied by Plextor.

For the most part, the 8Plex ran well, delivering the smooth video playback you'd expect from an 8X drive. However, it's doubtful that most users will see a dramatic performance improvement over the 6X (and perhaps even 4X) drives until CD-ROM titles and other multimedia software applications are optimized for the 8X drive's speedy transfer rate.

—Jeff Bertolucci

EIGHT-SPEED CD-ROM DRIVE: Plextor's new 8Plex transfers data at speeds of up to 1.2 megabits per second, according to the company.

8Plex

SCSI-based eight-speed CD-ROM drive promises ultrafast performance.
Plextor
800/886-3935
List price: Internal $399, external $499
Reader service no. 697

Adaptec Kit Offers Easy-to-Install SCSI Power

Most of today's off-the-shelf PCs come with IDE hard drives, but for speed and expandability it's hard to beat a SCSI-2 hard disk coupled with a dedicated controller. Adaptec's Power Storage Hard Drive Upgrade Kit, a one-stop shop for SCSI control, takes advantage of Win 95 Plug and Play support for painless installation.

The Power Storage kit includes the Adaptec AHA-2940 bus mastering host adapter, a Quantum Fireball 1080S 1GB hard drive in an external case, and all the cables and software you need to install the peripherals. A succinct and easy-to-understand installation guide is included, along with a detailed technical manual for more proficient users.

The kit comes in both ISA and PCI bus flavors, so it works with most PCs; the PCI version offers considerably better performance. I examined the shipping version of the PCI kit. Win 95 automatically detected the host adapter, installed its drivers, and set it up; all I did was plug in the card and connect the drive to it. (I still had to partition and format the drive manually.) Under Windows 3.1, the process is more complex: You have to press a hot key at boot time and set up the board's parameters manually in the AHA-2940's BIOS.

The Quantum Fireball 1080S hard drive is no slouch, especially when coupled with the PCI controller. I measured the combination's continuous data transfer rate at a hair over 5MB per second—more than twice that of your typical IDE drive. And the PCI controller allows for true multitasking under Windows 95, which IDE can't support. (I didn't test the ISA bus version, but Adaptec says its rate should be closer to typical IDE performance.)

At $599 list, the Power Storage Kit sounds expensive, especially since you can buy higher-capacity hard drives for half the price. But a SCSI card can quickly increase the performance of your existing system while offering an upgrade path for the future.

—Stan Miastkowski

Power Storage Hard Drive Upgrade Kit

1GB Fast-SCSI hard disk upgrade for virtually any PC.
Adaptec
800/442-7274, 408/945-8600
List price: $599
Reader service no. 698

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HiJaak PRO 4.0 is the professional 32-bit graphics toolkit for users working with Windows 95. It features top quality, fast image conversion, trace, and screen capture in over 85 raster, vector and metafile formats. It supports graphics view, print, find, enhance, thumbnail, catalog, browse and scan.

HiJaak PRO now also supports full PostScript Level 2 and five of the most common 3D formats: DXF, DWG, IGES, 3DS and VRML. HiJaak PRO makes it easy to accomplish any graphics task by providing shortcut menu access to HiJaak's most common graphics functions. Using HiJaak PRO, engineers can scan, trace, and catalog their legacy blueprints; graphics designers can thumbnail, organize, import, and enhance their clip art and convert incompatible files; and technical writers can take top quality screen captures and import them into any desktop publisher.

View 3D formats with user-selectable Point of View, and render 3D images in wireframe, flat, or gouraud shading. Using *MDI,* HiJaak PRO enables viewing of multiple images simultaneously. With the new font scanning utility feature, fonts that do not automatically register with Windows can be found and utilized. And with new support for extra large icons, you get thumbnails of images which are rich in detail and easy to see in the Windows 95 Explorer.

Call us at 1-800-683-6696 and ask for code 01200, or check out our website at http://www.quarterdeck.com/

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Circle 189 on reader service card

Internet Explorer Versus Netscape Navigator: Round Three

Over the past year, Netscape Navigator has become synonymous with Web browsing, and Microsoft's Internet Explorer has had to settle for a very remote second place. Navigator 2.0's advantages over Internet Explorer 2 include support for plug-ins, Java, and frames. The first two extend the browser's functionality beyond anything dreamed of by Navigator's developers. Internet Explorer 2 has few proprietary features of its own—background music, a scrolling text feature called Marquee, and that's about it.

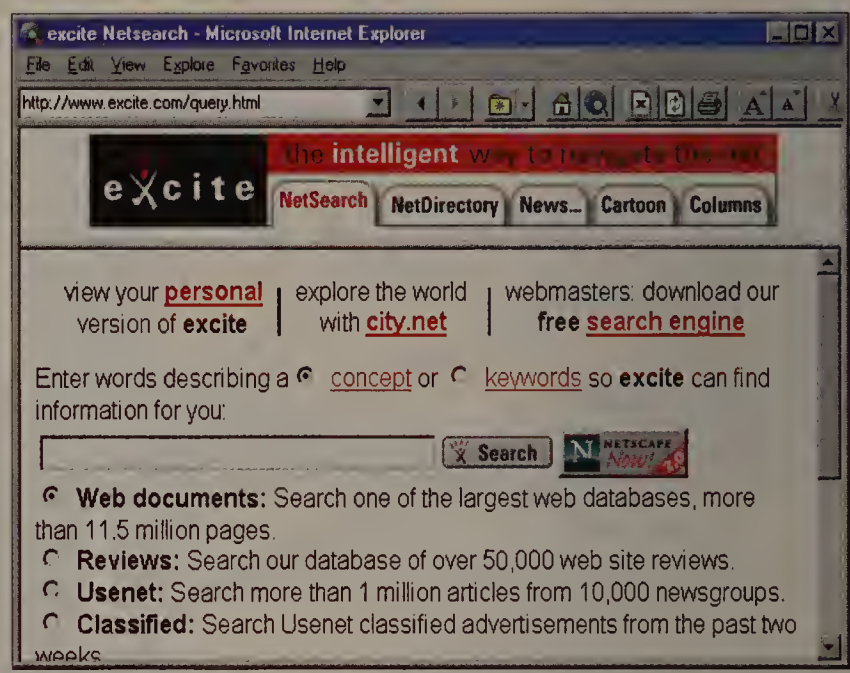
But everything's about to change. By the time you read this, version 3 of both products should be shipping, and now all bets are off.

Technical Knockout

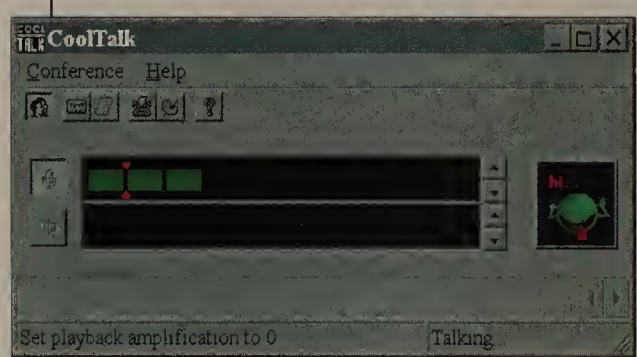
Internet Explorer isn't just playing catch-up. Sure, the new version supports plug-ins, Java, and frames, but in the grand tradition of software one-upmanship, its frames have an extra option: They can dispense with unsightly borders.

Microsoft is putting significant weight behind its new ActiveX object technology, which makes Internet Explorer 3 as expandable as Navigator, perhaps even more. Using ActiveX *controls*—or applets—developers can create Web applications currently possible only with Java and plug-ins. Microsoft is planning to release at least 20 ActiveX controls with Internet Explorer 3, and many third-party developers have announced additional controls.

Internet Explorer 3 supports TrueType fonts, so a Web author can define specific typefaces in a Web page. And if you're tired of the bloated Exchange client included with Windows 95, you'll be happy to know that Internet Explorer comes with Microsoft Internet Mail for sending and receiving Internet e-mail, as well as the Microsoft Internet Newsreader. Another control tool, complying with Recreational Software Advisory Council specifications, can apply a filtering system to shelter minors from unsavory sites. Microsoft has also announced that it will include a whiteboard tool with Internet Explorer 3, but it was not in the early version that we previewed.



INTERNET EXPLORER 3 does frames and almost everything else that Navigator does—and will be available as a free download.



NAVIGATOR 3.0'S BEST ADDITION is CoolTalk, an Internet phone client.

Reigning Champ

When we looked at a prerelease version of Netscape's next-generation Web browser, we found Netscape adding some innovations of its own. (Note: *PC World*'s parent company, International Data Group, is a minority shareholder in Netscape Communications.) CoolTalk is a terrific add-on from Insoft, which Netscape recently acquired. A full-duplex Internet phone client, CoolTalk includes a pop-up chat screen for typing, and a whiteboard paint applet; whatever you draw or type on your screen shows up instantly on the other person's screen. Built-in screen-capture lets you paste any portion of an open document onto the whiteboard so you and a colleague can annotate it during a chat session. The only thing missing from CoolTalk is OLE support for real-time object editing. Navigator 3.0 supports integrated audio and video and enhanced security options. There's no support for TrueType fonts, but Netscape says a future release will include it.

Get Ready to Rumble

Now that Navigator and Internet Explorer seem to support the same features, the question is, which one is more affordable? Microsoft will make Internet Explorer 3 available as a free download. Netscape still plans to charge $49 for its browser. You do the math.

However, another much-anticipated version of Internet Explorer, incorporating the Windows 95 Desktop Explorer for seamless online browsing and local file management, won't be free. That release, expected two to three months after Internet Explorer 3, is rumored to be a Microsoft Plus–like offering. Users who want that version of Internet Explorer will not have a free browser after all.

—Yael Li-Ron

Internet Explorer 3, Navigator 3.0

Browsers face off with comparable features.

Microsoft Corp.
800/426-9400
Pricing: free
Reader service no. 678

Netscape Communications Corp.
415/528-2555
Street price: $49
Reader service no. 679

WHAT EFFECT COULD SPEEDYROM™ HAVE ON YOUR CD-ROM DRIVE?

Let's face it. With most CD-ROM drives, you have to wait an eternity as the drive chugs along.

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Trading Software Bullish for Wall Street Buffs, Bearish for Beginners

These days it's almost easier to track your stocks online than through the newspaper. But once you have your data, what next? Tracking stock performance requires a program that's designed to monitor and analyze the vagaries of the market. Until recently, a package for this task cost at least $3000, affordable only for professional traders. Omega Research's $49.95 Wall Street Analyst is stock-tracking software for the rest of us.

Wall Street Analyst can generate a graphical chart for stocks traded on most exchanges. You can apply various performance formulas, called *indicators*, to a selected stock to determine how it will perform in the future.

I had no trouble loading the program, and in just a few minutes I was able to create a Microsoft stock chart and apply an indicator to generate a second chart. But once that was done, I wasn't sure what my charts were telling me. Sure, I could see that Microsoft's stock had climbed precipitously in the last year, and the indicator I applied to my data showed the market would be moving strongly one way or the other (it doesn't specify which direction, though). But the documentation explained only what the charts were doing, not which of the indicators was best to run on my stock, and it failed to explain indicators in general and how to use them. The documentation also neglected to explain whether the nifty little chart that showed me the indicator applied just to Microsoft stock or whether it included all the additional market data the program had socked away on my hard drive. The answer is probably so obvious to most serious investors that the documentation writers didn't think to mention it, but it's just this sort of lack of basic context that will trip up the neophyte user.

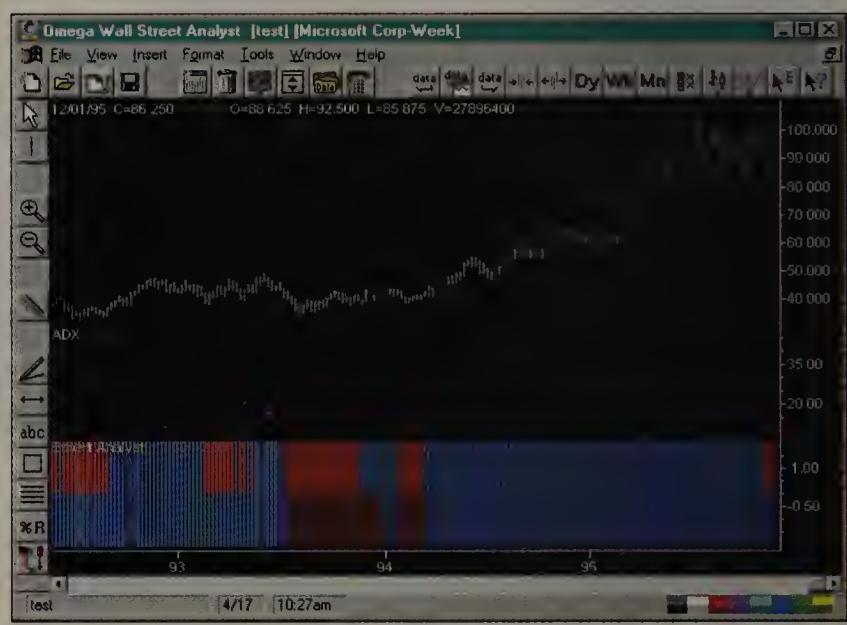
For the sophisticated stock buff who itches to perform a candlestick analysis or some other pet formula, Wall Street Analyst stands out because it is easy to use and includes about 30 indicators. It has an attractive, easy-to-understand interface and includes most of the obscure indicators favored by real traders.

If you're dedicated to learning stock analysis, you could probably do it with this program and a few good books; but if you just want a fun learning tool that will introduce you to basic investment concepts, forget it. The documentation admirably explains how the program works, but it doesn't tell you much about the market, nor does it explain key concepts—like indicators. It does recommend several books for further reading, in case you don't know where to begin.

—Cate T. Corcoran

Wall Street Analyst

The program is easy to use, but results may be confusing for stock novices.
Omega Research Inc.
800/556-2022, 305/270-1095
Street price: $49.95
Reader service no. 680



GENERATING CHARTS WITH WALL STREET ANALYST is easy, but understanding what they mean takes some market know-how.

Open Sesame: Mac Media for PCs

Until just a few years ago, putting a Mac-formatted disk into a PC's disk drive was like trying to stick a round peg into a square hole. Then along came utilities such as MacinDOS that let PC users read and write to Mac disks from their PC drives. They helped some, but could read only high-formatted floppies.

Now DataViz has come up with a transparent solution called MacOpener 2.0. You don't actually open the program, instead it runs in the background of Windows 95, NT, and 3.1. When you want to read a Macintosh-formatted disk, CD-ROM, or removable cartridge, just click on the drive from File Manager or Windows Explorer. MacOpener can read and copy Mac-formatted media as if it were formatted for Intel-based computers.

You can easily format Mac disks, including high-density disks, with the MacFormat command, which appears in the File menu in Windows 3.1 and NT, and is available in Windows 95 as a menu selection when you right-click a floppy drive icon.

If MacOpener senses a previously formatted Mac disk in the drive, you can use a Quick format option that cuts formatting time by 90 percent.

When you launch MacOpener, don't expect a program icon to appear in your Windows 95 Taskbar. But otherwise MacOpener works like a charm.

—Michael S. Lasky

MacOpener 2.0

Windows utility for reading Mac media on a PC.
DataViz
800/733-0030
Street price: $49
Reader service no. 681

QUARTERDECK

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QEMM lets you run more programs simultaneously, without those dreaded "out of memory" messages. QEMM's memory multiplier, MagnaRAM (also available separately), uses memory compression to increase the amount of memory available in Windows 95 and Windows 3.1. QEMM's Resource Manager controls Windows 3.1's User and GDI resources intelligently to allow you to load more programs at once.

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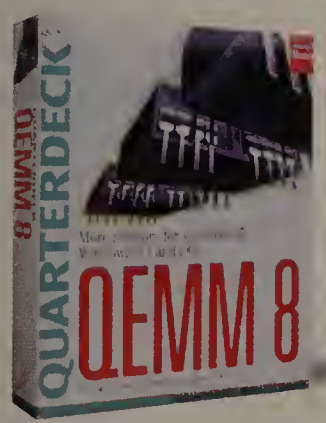
"QEMM takes memory management to a new level."
PC MAGAZINE, FEBRUARY 6, 1996

"...MagnaRAM 2 is the first and only utility to successfully tackle memory constraints on PCs running Windows 95."
"Stretch your RAM and open more files under Windows 95."
Verdict: ★★★★
PC COMPUTING, MARCH 1996



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INFOWORLD, NOVEMBER 27, 1995

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JERRY POURNELLE, BYTE, APRIL 1996

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Ask for code 01001. E-mail: info@quarterdeck.com

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Circle 185 on reader service card

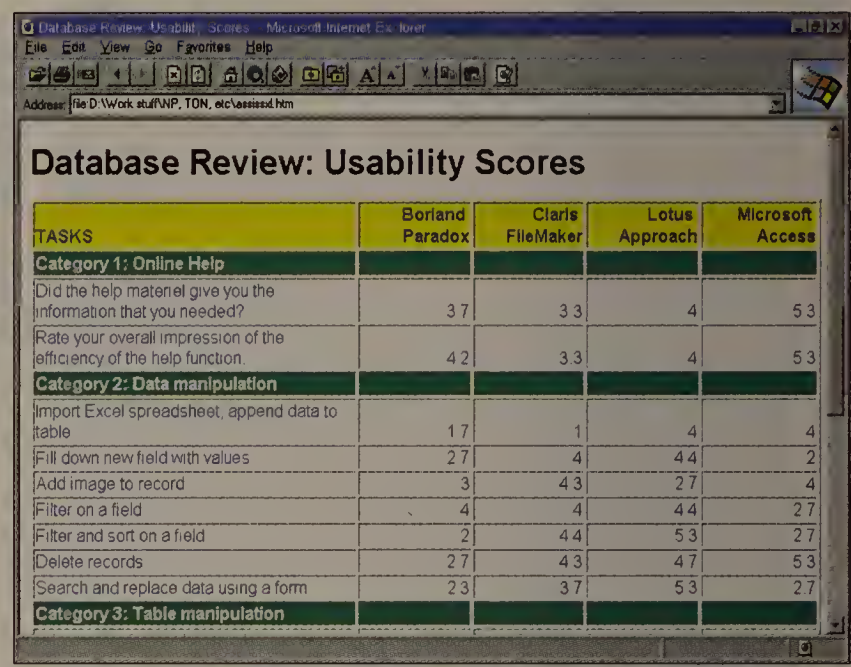
Internet Assistants Take Office to the Web

The new cog in the Internet wheel is converting existing documents into hypertext markup language. Microsoft Word already has an Internet Assistant that reformats pages to HTML output, so even Web novices can publish documents for the World Wide Web or corporate intranets.

Now Microsoft has extended this feature to the rest of Microsoft Office 95 with a collection of free Internet Assistants that can convert any Office document into an HTML page quickly and easily. For example, you can apply an Internet Assistant to a Microsoft Excel spreadsheet and generate an HTML table in a matter of seconds, while retaining special formatting such as background colors. Access data can also be converted to HTML tables. Schedule+ calendars and PowerPoint presentations are converted into static GIF images that you can post as a series of HTML pages. Competitors like Starfish's Internet Sidekick, on the other hand, let you post live calendar entries.

While Internet Assistant for Microsoft Word is an excellent tool for creating Web pages, the value of the other Assistants is limited by the nature of the applications' data. The Assistants generate static HTML pages that must be regenerated each time the original document changes. The PowerPoint tool is especially lacking: Original slides that include special effects lose the properties that make them engaging. Microsoft's solution is to offer a viewer for each Office application (except Schedule+). The viewer becomes a helper application that displays data in all its intended glory. But if you want to post Excel or Access tables that don't change often, the Internet Assistants can't be beat.

—Yael Li-Ron



Database Review: Usability Scores

TASKS	Borland Paradox	Claris FileMaker	Lotus Approach	Microsoft Access
Category 1: Online Help				
Did the help materiel give you the information that you needed?	3 7	3 3	4	5 3
Rate your overall impression of the efficiency of the help function.	4 2	3.3	4	5 3
Category 2: Data manipulation				
Import Excel spreadsheet, append data to table	1 7	1	4	4
Fill down new field with values	2 7	4	4 4	2
Add image to record	3	4 3	2 7	4
Filter on a field	4	4	4 4	2 7
Filter and sort on a field	2	4 4	5 3	2 7
Delete records	2 7	4 3	4 7	5 3
Search and replace data using a form	2 3	3 7	5 3	2 7
Category 3: Table manipulation				

FROM EXCEL TO WEB PAGE IN FIVE MOUSE CLICKS: The Excel Internet Assistant retains much of the original formatting.

Internet Assistants for Microsoft Office

Limited but helpful file converters.
Microsoft Corp.
Pricing: free
800/426-9400
Reader service no. 682

Rx for Sluggish CD-ROM Drives

If your CD-ROM drive is agonizingly slow, accelerator software could speed it up—but it will cost you space on your hard drive (and a few dollars as well).

Both Ballard Synergy's d-Time95 and PC-Kwik's CD-ROM Express accelerate the performance of your CD-ROM drive—shaving as much as 75 percent off the time for an average search. I examined these two 32-bit utilities under Windows 95, running them on a 90-MHz Pentium system with a 6X SCSI CD-ROM drive. I hadn't used an accelerator on this system before because most text searches produced results quickly.

Both accelerators disable Windows 95's CD-ROM cache program. CD-ROM Express and d-Time95 use similar technology: The software copies frequently accessed files—including search tools, indexes, and data —from the CD-ROM into a permanent cache on your hard drive. You set the cache size, but 30MB is an appropriate minimum.

When CD-ROM Express is searching a title that appears in its database (the list of titles is available via fax-back at 503/520-4200), it is 50 percent faster than d-Time95. But d-Time95, which runs only under Windows 95, uses fewer system resources and has generally better performance results overall. Unfortunately, d-Time95 has no ready-made catalog of indexes and tools—you have to create your own database for all of your discs.

Do you need to purchase one of these programs? On my Pentium system, it wasn't worth the price and hard drive space. But you might find these products useful if you have less-powerful equipment, say a 486-33 PC with a double-speed CD-ROM drive, and you use databases heavily. If most of your frequently used titles are in CD-ROM Express's database, I'd recommend it over d-Time95.

—Jeff Sengstack

CD-ROM Express

Excellent performance, but not as slick as d-Time 95.
PC-Kwik
800/274-5945
List price: $79.95
Reader service no. 683

d-Time95

Requires time and effort to get full value.
Ballard Synergy
800/692-0492
List price: $89.95
Reader service no. 684

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*Manufacturer's specification for output is 500 ANSI lumens at maximum setting. Performance of individual units may vary by up to ±10%.

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- 64-bit PCI 1MB DRAM Video
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Look Out, Travel Agents—Here Comes Travelocity

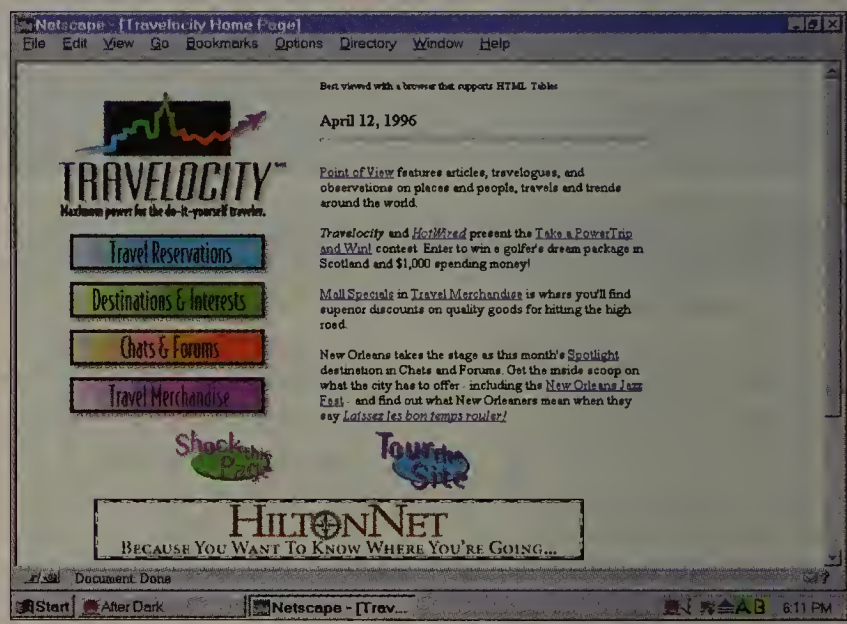
Travel sites are rolling onto the World Wide Web with the regularity of the tides, but the convenience and versatility of Travelocity (http://www.travelocity.com) will surely make it a favorite.

Travelocity's advantages start with the Sabre global reservation system, operated by AMR, American Airlines' and Sabre Interactive's parent company. This connection nets you 500 frequent flier points each time you buy AA tickets online. The site offers schedules for some 700 airlines, and online ticketing for 370. You can get info on 50,000 lodging places; booking for 28,000 hotels and 50 car rental firms will be available later this year. Other travel sites are skimpy by comparison: www.Travelweb.com, for example, lets you book lodging but lists only 6825 hotels.

Travelocity offers secure transactions for credit card purchases. (It supports secure HTTP, the protocol that the Netscape Navigator browser uses.) Tickets are sent by mail. But you don't have to give a credit card number to explore the site, which lists schedules and ticket prices, with and without restrictions. The 3 Best Itineraries feature acts like a virtual travel agent, finding the best options for you.

On the downside, Web traffic makes for slow replies.

—Michael S. Lasky



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Course on CD-ROM Teaches Managers About Diversity

Are you trying to provide sensitivity training for your workforce? You'll get it from Managing Across Difference, an interactive course on CD-ROM from Harvard Business School Publishing. It's designed to help managers improve their effectiveness in working with and communicating across all forms of workplace diversity. The course is based primarily on research conducted by Mary Gentile, the designer of the first diversity course at Harvard Business School. Gentile's credentials are impeccable.

As a multimedia training course, however, Managing Across Difference falls somewhat short: It's rich in text but poor in video. Too often you'll find yourself scrolling through a little window to read definitions or resource materials. You can listen to a voice read the prepared text, but that approach isn't much better.

Managing Across Difference shines in its Interactive Cases, in which actors illustrate problems such as the difference between intent and perception. The video window is small, but the material is gripping.

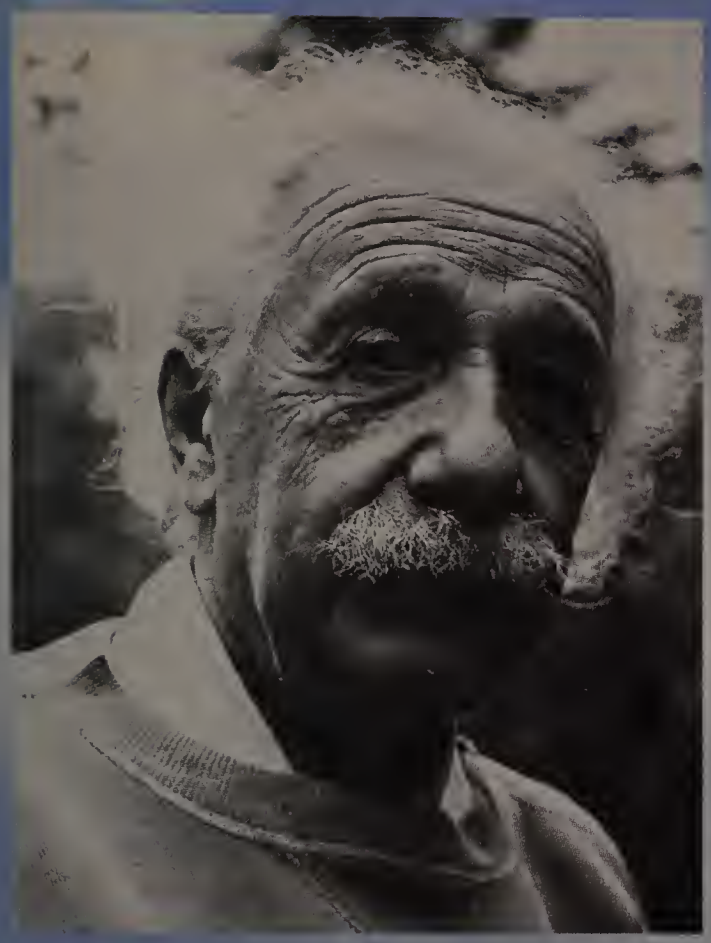
The program offers worthwhile content and requires less time and expense than an off-site seminar. But overall, this CD-ROM will work best in combination with a group discussion or speaker.

—Richard Morochove

HOT TOPIC: Managing Across Difference teaches about diversity. The disc provides good lessons, though it presents more text than video.

Managing Across Difference

A diversity training course on CD-ROM.
Harvard Business School Publishing
617/495-6700
List price: $450 per person for 25 to 49 users; volume discounts available
Reader service no. 689



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HotPage Helps Save and Organize Information From the Web

It's tricky to save information from a World Wide Web site to include in a document or keep for future reference, but DocuMagix HotPage can help. HotPage works with Netscape Navigator versions 1.2 and above, though not with Microsoft's Internet Explorer. I tested a preproduction version of HotPage, running it under Windows 95.

HotPage adds its own commands to the Netscape Navigator menu bar. These options include HotSave, HotPrint, and a link to a "filing cabinet" feature so you can organize and store documents.

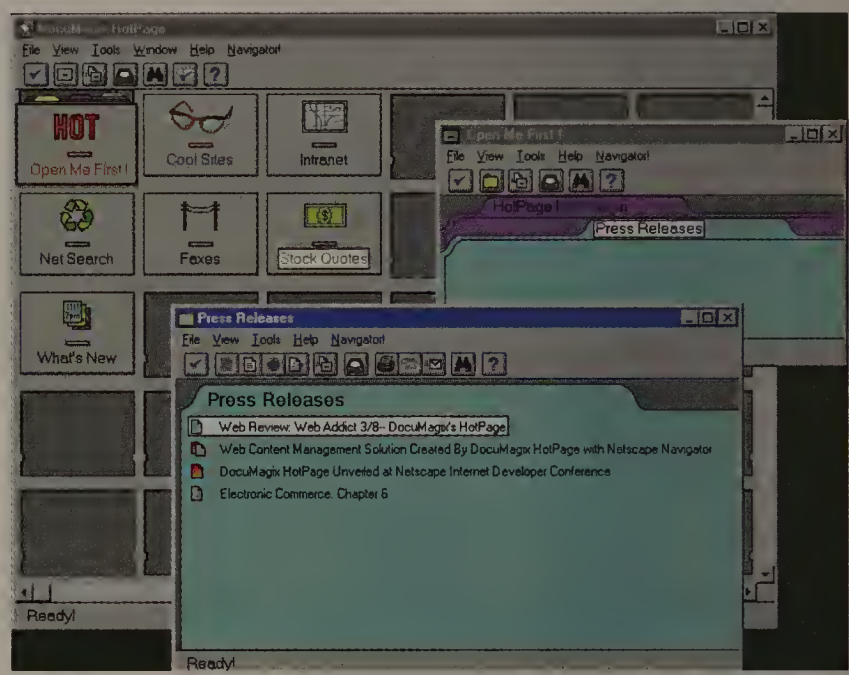
HotSaving a Web page stores it as an HTML document. HotPrint lets you save a Web page as a set of images corresponding to the paper pages you'd get if you printed the information. You view these "pages" with a graphical editor that shows thumbnail versions of each page.

This software also keeps your information organized. HotSaved or HotPrinted pages go into an "inbox"; from there you can send them to an appropriate file cabinet and folder.

On the downside, when you view a multiple-page HotPrinted document, you must click on the next page's thumbnail to view it. Also a problem: When you e-mail a HotPrinted Web page, it's sent as a series of TIFF files—one file per HotPrint page. So you'll probably choose to send only short documents. And you can't e-mail a HotSaved (HTML) version of a Web page.

Even with these limitations, I found HotPage convenient. You can preview HotPage on DocuMagix's Web site and purchase it there for $39; the retail version comes with Navigator 2.0 and costs $79.

—Pete Loshin



FILE IT: DocuMagix HotPage isn't perfect, but its file-cabinet interface helps organize documents you've taken from the Web.

DocuMagix HotPage

Save and store information from the Web.
DocuMagix, Inc.
800/362-8624
http://www.documagix.com
List price: $39 online, $79 with Netscape Navigator 2.0
Reader service no. 673

Meet Wildfire, My 24-Hour Administrative Assistant

It's inevitable: The minute I leave my home office, an important client calls. Instead of trusting messages to an answering machine, I've hired Wildfire, an electronic service that remotely takes, stores, and forwards voice-mail messages. Wildfire also answers your business phone, greeting callers with a company name. I tried Wildfire Version 1.3 for two months, and I'll keep using it.

If you run a home office or small business, you can subscribe to Wildfire. No equipment is needed, not even a PC. Costs average about $5 a day, or $150 to $200 per month, including long distance phone charges. You buy your long distance service through Wildfire service providers; I even saved money on these calls.

Wildfire also takes care of managing contacts. It reminds me of events and maintains data on up to 150 people, including their phone numbers. Setting up Wildfire and training it to recognize my voice took about an hour. To set up your contact list, you input the names and numbers by saying them or by sending a list of the information (via e-mail or floppy disk, in ASCII format) to your Wildfire provider. Unfortunately, you can't integrate Wildfire with other databases, contact managers, or personal information managers.

If I set up an itinerary, Wildfire will route calls to my home, car, or other location. I can say I'm going to be unavailable for a certain time, and Wildfire will take my messages.

When I'm on the road, I avoid those 75-cents-per-call hotel charges by placing one call to Wildfire and asking it to call a dozen clients, one at a time, simply by saying their names. If I'm out of the country, I get Wildfire to call me at a specific time: My calls are now based from the United States, so I save on overseas calling charges.

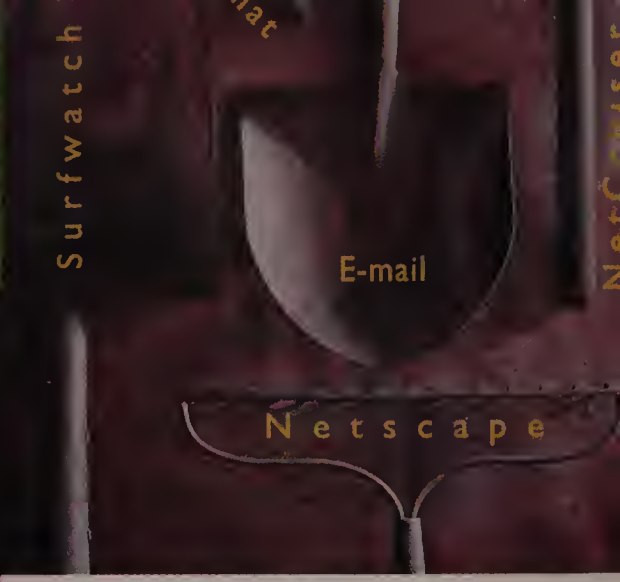
Two criticisms: The manual is skimpy, with few examples. And it's too bad I can't choose a male voice to answer calls instead of the one female voice that Wildfire provides.

—Steve Bass

Wildfire Version 1.3

Electronic service handles calls, messages, and more.
Wildfire Communications
800/945-3347, 617/674-1500
http://www.wildfire.com
Pricing: $150 to $200 per month average, including long distance
Reader service no. 674

Introducing



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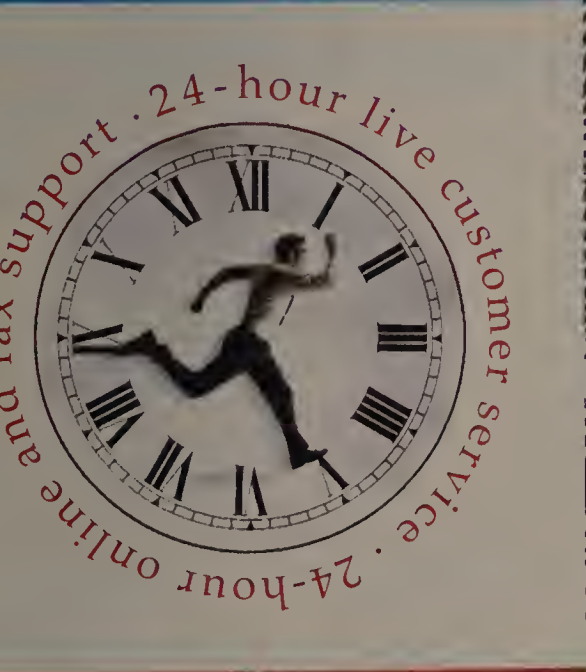

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Circle 126 on reader service card

Megahertz AllPoints Wireless E-Mail Leaves the Jack Behind

On a notebook PC user's Top 10 list of annoying problems, number two is looking for a convenient phone jack. (Number one, of course, is a dead battery.) If you spend a lot of time on the road and communicate mostly through e-mail, U.S. Robotics' new Megahertz AllPoints Wireless Modem frees you from constantly hunting for phone jacks. This small, light modem fits in a Type II PC Card slot and is powered by a 9-volt battery, so it doesn't steal power from your computer. At $499 list, it's inexpensive compared to its main competitor, the Motorola Personal Messenger, which is $799. I tested a shipping version of the Megahertz AllPoints modem, using it with a Hewlett-Packard OmniGo 100 palmtop.

The Megahertz AllPoints modem is the first product of its kind to use the RAM Mobile Data Network, a packet-based system that works like a cellular network, except that you are charged for the amount of data you send and receive rather than for your connect time. You don't run up a bill just checking for e-mail, and there are no added roaming charges. RAM Mobile says it covers more than 92 percent of U.S. urban business areas.

Megahertz AllPoints Wireless Modem

Wireless e-mail.
U.S. Robotics Mobile Communications Corp.
800/527-8677
List price: $499
Reader service no. 675

From RAM Mobile, your e-mail message is routed to one of two store-and-forward services, either RadioMail or Wynd. Both give you a wireless e-mail address and connect you to any Internet address. For this review, I set up a Wynd account, a process that was quick and easy. You can also send an e-mail message to a fax machine, or to someone's phone number to be delivered in voice format.

Installing the Megahertz AllPoints modem and Wynd was quick, and the Wynd e-mail interface was easy to use. On the downside, the modem itself is a bit large because the battery sticks out. Also, long messages don't travel quickly through the RAM Mobile system, which works at 8 kbps—far slower than today's 28.8-kbps modems. Nevertheless, wireless e-mail is very addicting.

—Tracey Capen

ALL POINTS BULLETIN: U.S. Robotics' Megahertz AllPoints Wireless Modem lets you send and receive e-mail without a phone jack.

Time Is Money: Count It Up With Caller ID Package

In the buzz about information highways, we can forget that our plain old telephones are becoming more intelligent all the time. Whozz Calling 4 is a Caller ID box and call-accounting software package that can make you look smart and save you some time. This hardware/software combo works with your PC so that when the phone rings, you see the name and number of whoever is calling. For billing purposes, the software tracks how long you speak with people who call. At $594 with software, the Whozz Calling 4 is pricey but worth it for phone-intensive small businesses that need a simple way to track phone time for billing.

The Whozz Calling 4 box, measuring 4.3 by 3.25 by 1.5 inches, connects to your PC's serial port and sits between your phone and the wall jack. I tested a shipping version of the unit, bundled with CallAudit Multiline 3.0 for Windows 95, a Caller ID program from Mountain Systems. (A Windows 3.*x* version is also available.) CallAudit works with popular contact managers to display information on your PC monitor as calls come in (the Whozz box itself does not have an alphanumeric display). You can now put all that information stored in your contact manager to good use. When your phone rings, the contact manager can pop up the record of the caller and show all your notes on that person.

To use the Whozz, you must enable Caller ID service through your regional Bell phone company; for me, this took one call to BellSouth. Exact costs vary: I paid a start-up fee of $10.50, then the regular monthly fee of $7.50. (Caller ID will be available in most parts of the country by June.)

Setting up the Whozz Calling box isn't any more difficult than connecting an external modem. But the user's guide needs some work: Its rather dry and lengthy description of the software would be improved with real-life examples.

—Pete Scisco

Whozz Calling 4

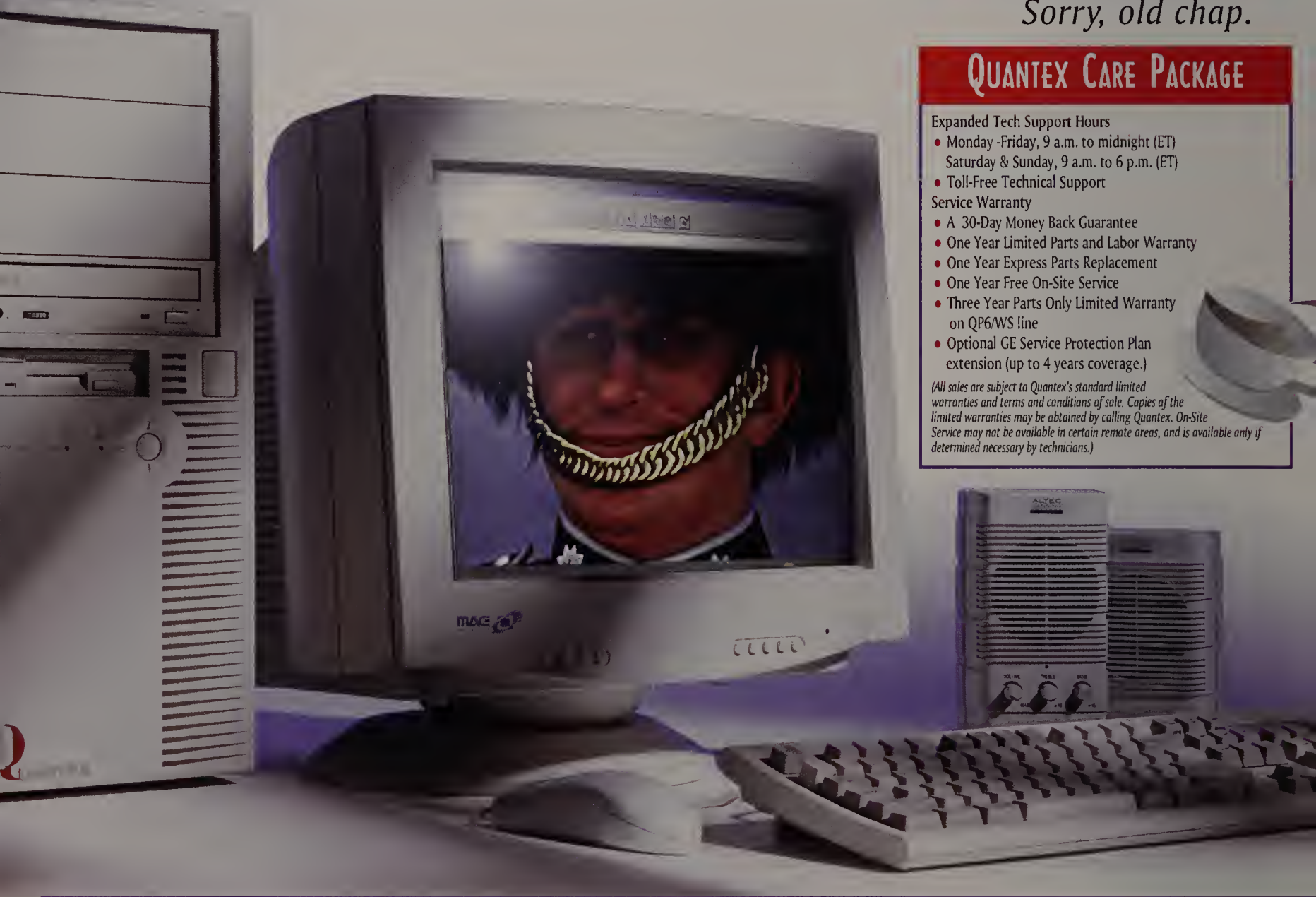
Use Caller ID and time your phone calls for billing.
Zeus PhonStuff
800/240-4637
List price: $594 with software
Reader service no. 676

Guess Who Just Got A Quantex

Quantex Makes A

Once he got his Quantex, this Beefeater knew that his days as a member of the Royal Guard were numbered. Whenever he'd think about his Quantex, he couldn't help but smile. After all, he'd just made one of the smartest buys since computers were invented. And it wasn't just the price, but the features and technology, too. Dollar for dollar, feature for feature, Quantex can't be beat. So after decades of spurning tourists trying to twist his mouth into a grin, his stony visage has fallen. If only he'd bought another brand, he'd have kept that unflappable frown.

Sorry, old chap.



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Windows Magazine 1996 Recommended

"The QP5/150 SM-2 is a brute that will keep the competition on its toes" (May '96).

Computer Shopper

"The most compelling configuration for its price remains the Quantex QP5/166 SM-2" (March '96).

1996 Editors' Choice HOME PC Top 100 Hardware

"If it's speed you're after, this QP5/100 M-4 Pentium trounces the competition" (April '96).

Newsweek

Special Edition "Computers & the Family" recognized the QP5/75 as one of the "14 Best PCs For the Long Haul."

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- Matrox Millennium 64-Bit 3D Video w/2MB WRAM
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- BodyWorks 5.0
- Me & My World Multimedia Picture Dictionary
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- Quicken SE
- Comptons Interactive Encyclopedia
- Comptons Reference Collection
- SharkWare (Top-Selling Contact Manager)
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- Astound (#1 in Multimedia Presentations)
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Best Products of 1996

Your ultimate buying guide to 82 top products and companies, winners of PC World's 14th annual World Class awards.

BY ERIC KNORR

PIERRE-YVES GOAVEC

PC TECHNOLOGY normally advances at an even pace—a software upgrade here, a faster processor there, and a Microsoft conquest every few months. But over the past year we've been treated to a three-ring circus: the explosion of the World Wide Web, the ascent of home computing, and the rock 'n' roll rollout of Windows 95.

In the midst of this crazy tangle, we asked a group of informed spectators to tell us what they thought were the best and worst products and services of the year. Our nearly 2000 handpicked experts—consultants, market researchers, journalists, user group presidents, and a select group of longtime *PC World* subscribers—had ringside seats to this year's computing events. Based on a survey sent to these experts, we present the results of our 14th annual World Class awards.

Think of these results as a handbook for trying times. Many of the choices merely reflect the strong pull of tradition, such as Hewlett-Packard walking away with nearly all the printer awards or Microsoft Encarta snagging best CD-ROM reference. Other selections, such as Netscape Navigator's taking product of the year, reflect the epidemic excitement over all things Internet. (International Data Group, the parent company of *PC World*, is a minority shareholder in Netscape Communications.) But the choice that raises the most questions—and has the highest entertainment value—is of Windows 95 as unfortunate recipient of our new award for loser of

PRODUCT OF THE YEAR
Netscape Navigator

ON THE DESKTOP
The Bare Essentials of Computing **98**

ON THE ROAD
The Mobile Office **98**

THE PRINTED PAGE
Printers and Scanners **99**

MOST PROMISING NEWCOMERS
Likely to Succeed **99**

IN A WIRED WORLD
Necessities for Getting Online **100**

MOTION AND SOUND
CD-ROMs and Multimedia Hardware **100**

STORAGE
Drives in All Media **101**

SERVICE AND SUPPORT
Hardware and Software **101**

LOSER OF THE YEAR
Windows 95 **101**

APPLICATIONS
Home and Office Productivity **102**

WORKING TOGETHER
Necessities for Workgroups **102**

THE BASIC TOOLS
Utilities, Shareware, OCR **106**

GETTING ORGANIZED
Time and Money Managers **106**

MAIL ORDER
High-Tech Shopping **106**

ON THE DESKTOP

Business Desktop Computer
Gateway 2000 Professional line

Home Desktop Computer
Gateway 2000 Family PC line

Input/Pointing Device
Microsoft Natural Keyboard
Logitech MouseMan '96

Monitor 15"
NEC MultiSync XV 15+

Monitor 17"
NEC MultiSync XV 17+

Operating System/Environment
Windows 95

ON THE ROAD

Laptop/Notebook Computer
IBM ThinkPad 755CD

Subnotebook Computer
IBM ThinkPad 701C

PC Card Modem
Hayes Optima 288 V.34+Fax With EZJack

Personal Digital Assistant
Apple Newton
HP OmniGo 100 Organizer Plus

Wireless Communications Device
SkyTel SkyCard PCMCIA Card

the year—*and* a close second for product of the year. Windows 95 was also voted best operating system/environment. This contradiction is a sure sign of the mixed feelings, thorny feuds, loathing, and admiration that Microsoft's much-hyped operating system has fueled in the world of computing. (See "Windows 95: Love to Hate It.")

The Computer Is in the Mail

When our experts turned their eagle eyes to hardware, one thing was obvious: Mail order rules. For three years straight, the top three mail-order vendors—Dell, Gateway 2000, and Micron—have landed the awards for best desktop PC. This year, after taking the top slot in two out of three previous years, Gateway 2000 swept both the business and home desktop categories with its Professional and Family PC lines. Why did our voters prefer Gateway? Apparently not for its tech support—Gateway didn't even show up on the radar in the service and support category.

Name recognition, word of mouth, rock-bottom prices, and flexibility, however, are a hard combination to ignore. "I voted based on the cost of the systems and my personal experience with the company," says Thomas Lowe, director of data automation programs at the International Trade Administration in Washington, D.C. "Gateway's strength is their ability to assemble systems in the configuration you want. But that's also their weakness: If you aren't specific, you may get several of the same model machine with different components—different video cards in particular. That can be a problem when you need uniformity on a LAN."

When the computer in question has to handle the big job of serving a network, our experts turn to companies with higher prices and bulletproof reputations: Compaq, HP, and IBM. This year HP's NetServer line and IBM's PC Server line tied for first place as best network server. Not coincidentally, our experts voted HP the best in hardware service and support, while IBM took third place in this category. Compaq, whose ProLiant 2000 was champion of the network servers last year, slipped a bit this time around. The ProLiant line came in second place for best network server, with Compaq in fourth place for tech support.

The Face of Things

When you buy a PC, you probably use the monitor that comes with it. But when you upgrade your display, you shop for quality. That's one reason NEC's MultiSync XV line won in both the 15- and 17-inch categories. NEC has been building a reputation for quality monitors since the first MultiSyncs, and its reputation has defended it in the face of stiff competition. Although other monitors have often earned Best Buys in *PC World*'s Top 10 roundups, NEC wins here. Price seems the only factor that can sway consumer loyalty: Last year, NEC's long World Class winning streak was broken by lowballer ViewSonic; this year, with the budget-priced MultiSync XV line, NEC regains its title.

But a new monitor without a new graphics card is only half an upgrade. For the third year in a row, Diamond Multimedia grabbed the award, this time

THE PRINTED PAGE

High-End Color Printer
Epson Stylus Pro/Pro XL
Tektronix Phaser 340

Personal Color Printer
HP DeskJet 850C/855C

Personal Monochrome Printer
HP LaserJet 5/5M

Multifunction Device
HP OfficeJet LX

Scanner
HP ScanJet 4c

MOST PROMISING NEWCOMERS

Hardware
Intel Pentium Processor 166
Intel Pentium Pro Processor
Iomega Zip drive

Software
Netscape Navigator 2.0

NEW ARRIVALS SHARE THE GLORY

One important category this year left our experts unable to make up their minds: most promising hardware newcomer. So the Iomega Zip drive and the Intel Pentium Pro and Pentium-166 processors had to share this coveted title. Leaving aside the Zip (everyone seems to love that little drive), why the ambivalence between the two processors? After all, the Pentium Pro can brag about a lot more new technology than the Pentium-166 can—including a built-in secondary cache and beefed-up logic for executing instructions in parallel—which means that you should get a lot more speed out of this processor.

In fact, the Pentium Pro *is* faster than the Pentium-166—but only when all your software is truly 32-bit. And there's the rub: Neither Windows 3.*x* nor Windows 95 is a full 32-bit environment. Only people who are running all 32-bit applications and a true 32-bit operating system, such as Windows NT, will witness the full power of the Pentium Pro. Oh sure, on a Pentium Pro you'll get incremental speed benefits over a P-166 when using 32-bit applications under Windows 95. (For test results, see "P6 Faster—and Slower—Than Pentium," October 1995.) But for most of us it's not worth the extra cash outlay it takes to get our hands on a Pentium Pro system.

And the Pentium Pro is actually slower than the Pentium-166 when running 16-bit applications—which, if the winners in the software application categories are any indication, most people are still using. Even Intel admits that it doesn't expect the Pentium Pro to be a mainstream product until 1997, when presumably we'll all be running Windows NT or a true 32-bit version of Windows 95. If this sounds like a stretch—even for Bill Gates's marketing team—that's the reason the Pentium Pro wasn't the sole winner in this category.

For today, the Pentium-166 delivers plenty of power to keep most of us happy, and it remains the choice of true speed lovers. You pay a premium for the P-166, even though it's only about 10 percent faster than a P-133 (because its bus stays fixed at 60 or 66 MHz). But you always pay more for the fastest mainstream CPU. By the time you read this, the Pentium-200 probably will have shipped, and Pentium-166s will suddenly be the hottest bargains around. —*E. K.*

with its Diamond Stealth64 Video 3200. Never mind that Diamond has a reputation for shaky drivers—and that its Windows 95 drivers won't help (see June's "Graphics Boards: Speeding Down Highway 95"). Forget, too, that there's a Web site called Diamonds Aren't Forever that's devoted to gripes about the company's Viper card. With graphics cards, it's price and performance that score big points, and Diamond plays that game very well.

Have a Few for the Road

IBM was merely a fifth-place finisher in desktops—but when it comes to notebooks it stole the show. This year, for the first time, IBM machines thumped the competition by taking awards for both best laptop/notebook computer *and* best subnotebook computer. The durable ThinkPad notebook line, which sent the competition fleeing in 1994, won once again, this time with the multimedia ThinkPad 755CD.

The IBM ThinkPad 701C, the subnotebook with the amazing unfolding "butterfly" keyboard, was also voted the best of its breed. Patricia Hill, editor of the user group newsletter *Computer Booters* in Sun Lakes, Arizona, notes that the ThinkPad's design is "the most user-friendly I've run into. And I know IBM stands behind its notebooks, replacing them quickly if anything breaks."

In bestowing the award for best personal digital assistant—that smallest of mobile computers—our experts were divided across platforms. Yes, the Apple Newton tied with Hewlett-Packard's OmniGo 100 Organizer Plus (the successor to the HP100LX) for best PDA. Those inclined to chuckle at *PC World*'s endorsement of the much-maligned Newton might want to check out the latest model, which includes version 2.0 of the Newton operating system; it offers vastly improved

IN A WIRED WORLD

Online Service
America Online

Web Site
Yahoo

Internet Service Provider
Netcom

Fax-Modem
Sportster 28.8 Faxmodem (U.S. Robotics)

Fax Software
WinFax Pro 7.0

Communications
Procomm Plus 3.0 for Windows

LAN E-Mail Package
Lotus cc:Mail for Windows

Remote Access/Remote Control
Norton pcAnywhere-32

Internet Interface/Utility
Netscape Navigator 2.0

Web Authoring Tool
Microsoft Internet Assistant

MOTION AND SOUND

Graphics Accelerator Board
Diamond Stealth64 Video 3200

Sound Card
Creative Labs Sound Blaster 16

Multimedia Upgrade Kit
Creative Labs Discovery Multimedia Upgrade Kit

Business Tool
Microsoft Office for Windows 95

Children's Education CD-ROM
Microsoft Encarta

Adult Education CD-ROM
Microsoft Encarta

Reference CD-ROM
Microsoft Encarta

Entertainment CD-ROM
Microsoft Cinemania

CD-ROM Game—Adults
Myst (Broderbund)

CD-ROM Game—Children
Where in the World Is Carmen Sandiego? (Broderbund)

handwriting recognition, not to mention support for more than 1000 software applications. Our experts know a cult favorite when they see one.

The hottest piece of mobile hardware this year isn't a laptop computer or a handheld device at all. Iomega's Zip drive was voted the best removable portable drive, and it tied with Intel's Pentium Pro and Intel's Pentium-166 for most promising hardware newcomer (see "New Arrivals Share the Glory"). Everyone loves this little one-pound device with its 3½-inch, 100MB cartridges and slick software. The Zip drive isn't the speediest removable storage product available, but as a portable personal data vault, this $200 drive is hard to resist.

The Need to Print

Despite all efforts to the contrary, most of us still create gobs of unnecessary printouts that fill up our recycling bins. And the temptation to click the print icon is greater than ever with the latest crop of printers. Take this year's winner for best personal color printer, the HP DeskJet: For around $500 you get superb color output, crisp 600-dpi text, and excellent software controls.

It's no surprise, then, that Hewlett-Packard took awards in almost every printer category. Because of their high prices, HP's printers don't come out on top in every *PC World* review, but they almost always place. And with readily available supplies, reliable construction, excellent technical support, and standard-setting features, the company has developed a loyal group of customers. That's why HP printers have won World Class awards year after year. Gregory Dow, president of Splash, a user group in Berkeley, California, speaks for many: "From what I've seen, HPs consistently have the best output quality. The machines are well designed and well built." Asked about the warranty and technical support, Dow replies, "I've never had a need for either."

Even in a brand-new category, best multifunction device, HP's OfficeJet LX was the favored all-in-one printer, copier, and fax machine—the hottest hydra of the home office. And at the paper-munching end, the HP ScanJet 4c took best scanner—continuing a three-year ScanJet winning streak. If it has to do with paper, it seems, HP rises to the top of the heap.

However, in one paper-related category, workgroup monochrome printers, it might be worth your while to look beyond HP brand loyalty. The second-place finisher, the Lexmark Optra line, has earned a Best Buy in every *PC World* printer roundup since February 1995. The sleek Optra R+, for example, sells for nearly a third less than the HP LaserJet 5M

STORAGE

Hard Drive
Western Digital Caviar AC31600

Removable Portable Drive
Iomega Zip drive

Tape Backup Drive
HP Colorado T1000-E

CD-ROM Drive
NEC MultiSpin 6X

Writable CD-ROM Drive
HP SureStore CD-Writer 4020i

Optical Drive
Pinnacle Micro Apex

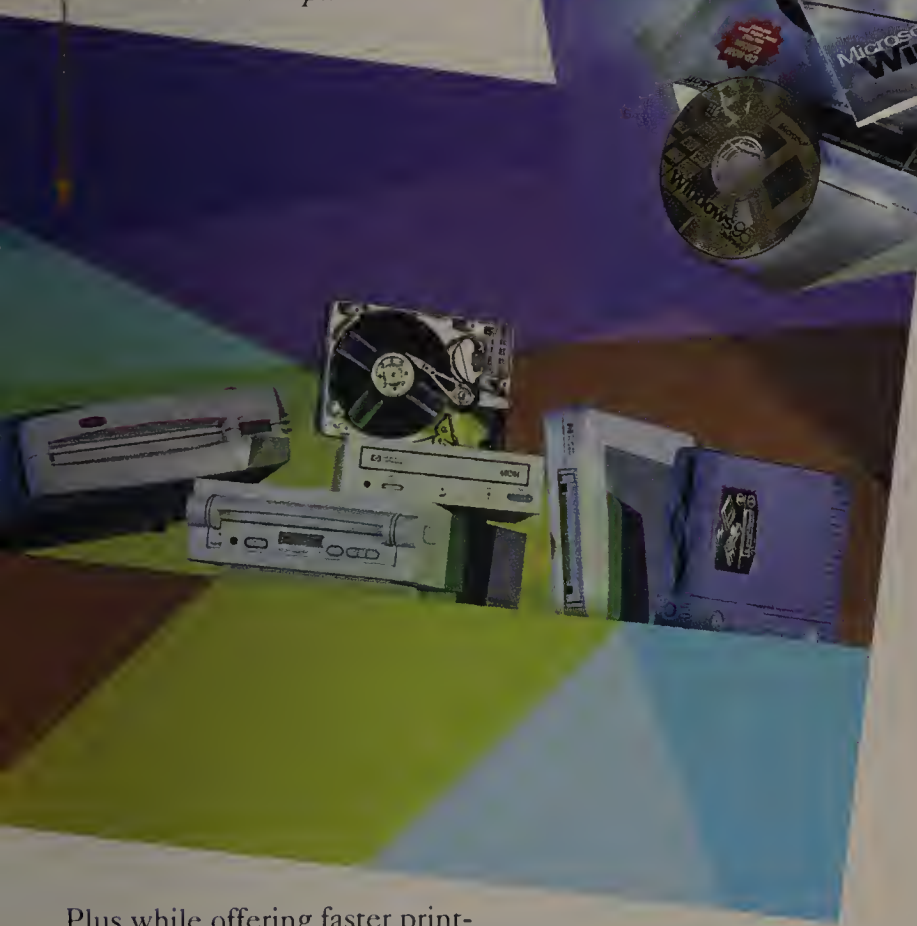
SERVICE AND SUPPORT

Hardware
Hewlett-Packard

Software
Microsoft Corporation

LOSER OF THE YEAR

Windows 95



Plus while offering faster printing and sharper output.

Multimedia Goes Home

Do you really need multimedia at the office? Face it, you're not really going to use those $100 speakers to listen to voice mail. Serious hardware is for games, learning, and reference titles. In fact, multimedia for the home is the driving force behind today's hardware advances.

CD-ROM titles have a reputation for being here today, gone tomorrow, but Microsoft Encarta has had remarkable staying power. This multimedia encyclopedia stomped the competition for the third year in a row, this time garnering three titles: best reference CD-ROM, best children's education CD-ROM, and best adult education CD-ROM. In addition, Broderbund's Myst enjoyed its second year as most popular CD-ROM game for adults. The nearest competitor, Doom 2, ranked a distant second (maybe because our respondents didn't want to admit to their darker urgings).

Proving their dedication to the cause, our experts chose the fastest CD-ROM drive available to spin these discs: the NEC MultiSpin 6X. But the most interesting pick in this category was number three, the NEC

WINDOWS 95: LOVE TO HATE IT

We weren't surprised that Windows 95 was hailed as the best operating system/environment by our panel. But how could this same group of experts name it loser of the year? To plumb this marvelous contradiction, we interviewed a random sample of experts who'd given Windows 95 the thumbs-up, along with an equal number who gave it the thumbs-down.

Everyone we spoke to who pinned "loser" on Windows 95 complained about Microsoft's big buildup. Some, such as Paul Hethmon, a programmer and analyst for the University of Tennessee, felt let down by the operating system. "There was a lot of hype about what Windows 95 was going to be, and it just didn't live up to it."

David Wollrich, a senior consultant for CompuConsult of Fairfield, California, was disappointed, too. "I don't think Windows 95 advances computing as much as Microsoft claimed it would. It hasn't yet achieved the ease of use of the Mac."

Several of our experts also felt that Windows 95 had been shipped prematurely. "Windows 3.1 and its applications worked fine on our network," says Dave Mackay, network administrator for Land o' Lakes of Fort Dodge, Iowa. "Windows 95 and its applications did not. Our workstations were crashing all over the place." According to *Computer Booters* newsletter editor Patricia Hill, "Microsoft should never have released Windows 95 without tape backup support."

Made cautious by negative criticism, many of our experts delayed upgrading to Windows 95 and its applications. In fact, given the choice between Windows 3.1 and Windows 95 versions of Word and Excel, our respondents chose the Windows 3.1 versions.

> Everyone who pinned "loser" on Windows 95 complained about Microsoft's big buildup.

Ultimately, it all boils down to personal experience. "For me, the switch was seamless," says Scottsdale Automation's treasurer, John Smith of Phoenix, Arizona, who voted Windows 95 product of the year. "I took the plunge and converted almost entirely to 32-bit applications, and I'm very pleased." Joyce Madden, founder and president of Computer CACHE, a Denver user group, offers a viewpoint often cited by Windows 95 fans. "It's a step in the right direction for people who aren't computer literate," says Madden. "My husband doesn't know much about computers. With Windows 95 he can do anything he wants."

Bruce Freeman, president of the Northeast Technical Association in Livingston, New Jersey, selected Windows 95 as product of the year because he feels that the interface changes are significant and that everyone will upgrade eventually. "Windows 95 isn't merely a new application that changes only part of the way we compute," he says. "It's changing the totality of the way we compute." —*E. K.*

APPLICATIONS

Word Processor
Microsoft Word 6.0

Spreadsheet
Microsoft Excel 5.0

Database—Personal
Microsoft Access

Database—Professional
Microsoft Access

Applications Suite
Microsoft Office 95

Desktop Publishing
Adobe PageMaker 6.01

Presentation Graphics
Microsoft PowerPoint

Draw Software
CorelDraw 6.0

Computer-Aided Design
Autodesk AutoCAD R13

3-D Graphics
Autodesk 3D Studio 4.0

Image Editing/Paint
Adobe Photoshop 3.05

WORKING TOGETHER

Groupware Application Environment
Lotus Notes release 4

Group Discussion
Collabra Share 2.2

Document/Video Conferencing
Intel ProShare Video Conferencing System 200

Electronic Document Distribution
Adobe Acrobat 2.1

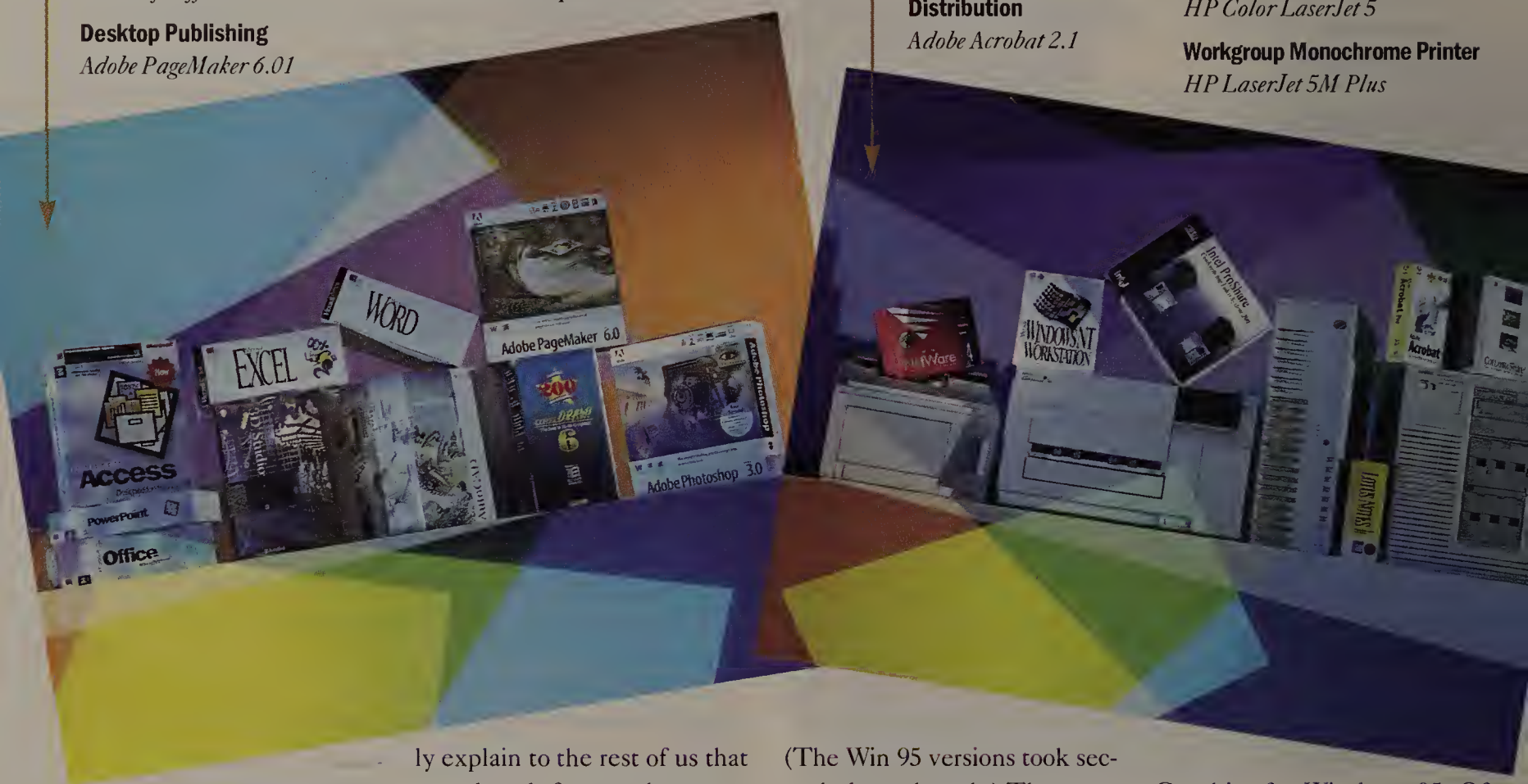
Network Server
HP NetServer line
IBM PC Server line

LAN Operating System (Peer-to-Peer)
Microsoft Windows NT

LAN Operating System (Server-Based)
Novell NetWare 4.1

Workgroup Color Printer
HP Color LaserJet 5

Workgroup Monochrome Printer
HP LaserJet 5M Plus



MultiSpin 4x4, a $250 drive that spins four discs at quad speed. Since there's little real-world performance difference between 4X and 6X CD-ROM drives, the convenience and low price of the Multispin 4x4 make it a hot deal.

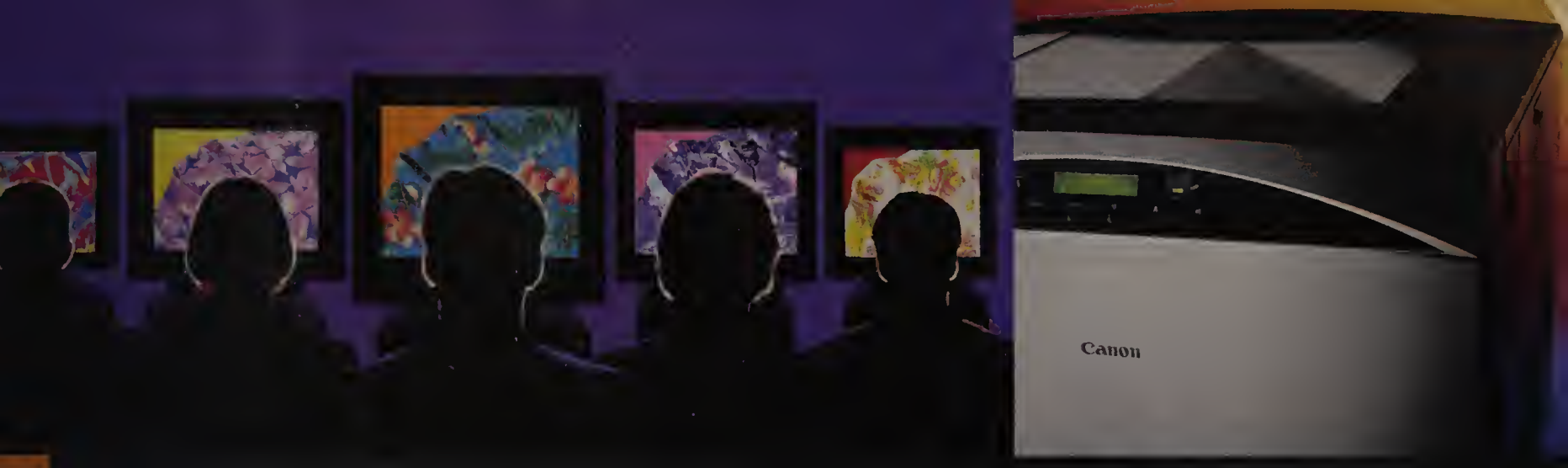
When it comes to PC sound systems, it seems the name Creative Labs is on the tip of everyone's tongue. A Sound Blaster board again dominates the sound card category, while the company's Discovery Multimedia Upgrade Kit (sound card, CD-ROM drive, software bundle, and speakers) was undefeated for the third straight year. While audiophiles may patiently explain to the rest of us that sound cards from such companies as Turtle Beach and Ensoniq have better fidelity, those products lack the attractive pricing and—especially important for DOS CD-ROM games like Myst—the compatibility of the popular Sound Blaster line.

The 800-Pound Gorilla Is Still Hungry

Can anyone break Microsoft's hold on business applications? Is there any point in even hoping for a close game anymore? This year, Word for Windows was voted best word processor, while Excel claimed best spreadsheet. Interestingly, the Windows 3.1 versions of both Word and Excel each edged out the Windows 95 versions for first place. (The Win 95 versions took second place, though.) The nearest competitors, Lotus 1-2-3 and Novell's WordPerfect, took third place in their respective categories, each gathering only around 25 percent of the votes.

Microsoft Access, a slick database application that targets both developers and casual users, was endorsed by about two-thirds of our experts as the best personal database, and it also won in the professional database category. (The second-place finisher among professional databases was Borland's Paradox.) And Microsoft made yet another conquest this year: For the first time, PowerPoint took the presentation graphics category, handily beating Harvard Graphics for Windows 95. Of course, PowerPoint comes along for the ride when you buy Microsoft Office. And no one was surprised that Microsoft Office 95 was the winner in the applications suite category.

Step a little outside mainstream software, however, and Microsoft's world dominance ends. Adobe PageMaker still leads in our desktop publishing category, despite a new Windows 95 version of Microsoft Publisher. And lacking any Microsoft competition, CorelDraw claimed the draw software category for the fifth year running. So far, Microsoft hasn't ventured into computer-aided design software, so AutoCAD—which



16.7 million colors, yet it goes with everything.

Introducing the network compatible, Color Laser Beam Printer 360PS.

You want a color laser printer that stands out. But it's got to go with your network, right? Then the new Color Laser Beam Printer 360PS from Canon is the perfect match for your business.

The Canon C LBP 360PS puts all 16.7 million colors of the rainbow within your reach. It's plug 'n' play, and connects easily with Macintosh,® Windows™ and UNIX operating systems, plus Ethertalk, TCP/IP, and Novell® IPX networking environments. Innovative Fiery XJ Downloader™ and Spooler™ software give you unmatched flexibility when downloading PostScript™ files and managing network printing. Which means while you print, your computer is free to go on to the next job.

Adobe PostScript

And because Canon's the leader in laser technology, you'll see vivid, continuous tone color at blinding speeds. With the built-in Fiery™ XJE™ controller, the C LBP 360PS prints out 3 full-color pages per minute, with a resolution of 600 dpi. Plus, it feeds letter-or legal-size paper with a capacity of up to 600 sheets. In fact, the C LBP 360PS makes color printing so efficient, it can't help but make you look good.

fiery driven

So if you're looking for a high-quality, color laser printer to go with your network, we have the system that is the solution. The C LBP 360PS from Canon. For more information, just call **1-800-OK-CANON.** Or visit us on the Web at **http://www.usa.canon.com**

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PostScript is a trademark of Adobe Systems Incorporated [illegible] in the U.S. and other countries.
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Canon

Is It World Class Yet?

There's one key point to remember about beauty contests and elections: Somebody has to win, even if the winner is ugly or crooked. Last year, what did our panel of experts crown as product of the year? IBM's OS/2 Warp, a product so hopelessly doomed that its PowerPC version, long in development and once strategically crucial, was finally abandoned before its release.

Don't blame me. I didn't vote. The editors left me off the panel again this year. Instead, they handed me the task of pontificating on Things to Come. So here's my quick take on the World Class awards of 1997: Hardware will get faster, smaller, and cheaper. Software won't.

I'm sticking my neck out a bit with that software prediction. Only a bit, though. Even if all the hype about the Java programming language is to be believed, software won't get faster. But according to the hypesters, it could get smaller and cheaper, because clever developers will write compact, sleek applications that people will rush to download from the World Wide Web.

I'm not holding my breath. Programming languages rarely change the course of history. When programmers have good ideas, they figure out a way to write them up. The mere arrival of a new language is unlikely to unleash a torrent of creativity. We'll soon see if Java delivers the gusto or just the jive.

When it comes to computers themselves, the excitement is likely to be found in smaller, lighter, modular portables with plenty of battery life and prices somewhere below the stratosphere. Now that I've fondled IBM's Palm Top PC 110, a 1.6-pound computer the size of a paperback novel and available only in Japan, I want a tiny machine. It has to have a decent keyboard, though; that unit doesn't.

Otherwise, next year's most important hardware essentially will fall into two categories: peripherals and their connections. For years the built-in, daisy-chainable SCSI port on every Macintosh model has meant that connecting stuff like scanners and outboard disk drives was trivial. On PCs, where there are no standard high-speed connectors and always a shortage of ports, we're forever trying to hook up new devices on the cheap. Want some bad examples? Try tape drives that connect to a PC's lethargic floppy-disk controller.

So here come two solutions: the Universal Serial Bus and IEEE 1394. USB is for slower devices like keyboards, modems, and mice, while 1394 is for high-bandwidth stuff like hard drives. USB is cheaper, so we'll likely see it first, but we'll probably like 1394 more because faster is always better.

> As with politics, somebody has to win, even if the winner is ugly or crooked.

I've written before about the promise I see for DVD, the high-capacity optical disk format embraced by the computer and movie industries. When it comes to consumer electronics, I like cheap, and I like DVD's chances. Other winners in the world of removable mass storage are inevitably magnetic and proprietary but cheap (Zip) or standard and optical but expensive (magneto-optical). Since I like cheap, I see next year's likely comers as the speedy removable 1GB disks from Iomega and SyQuest; Panasonic's slower 650MB phase-change PD-CD drive; and perhaps most likely to succeed, the LS-120 drive (currently available in some Compaq machines) that can read and write standard 1.44MB disks and new 120MB disks.

BY STEPHEN MANES

Will ISDN or cable modems be World Class next year? Only if we devote a category to them. So far, ISDN doesn't seem to be enough of an improvement over standard modems to make it worth its higher price and setup hassle. Cable modems achieve stunning throughput in small-scale demos, but most experts see problems making them work in the real world.

And on the Internet, you're deliriously happy when you actually manage 2400-bps throughput even with your 28.8-kbps modem. Most of the time you sit through "Waiting for connection" and "Opening such-and-such" messages. Maybe next year there'll be categories for "Fewest Delays on a Web Site More Than 15 People Visit Regularly" or "Speediest Site Containing Only Self-Promoting Blather."

And if there are, remember: Just as in politics, somebody has to win.

KAREN MOSKOWITZ

has had a stranglehold on the category ever since Autodesk founder John Walker decided that drafting on the PC was a neat thing to do—seems secure enough. In image editing/paint, Adobe Photoshop has triumphed ever since we introduced the category four years ago.

Other areas yet to be conquered by Microsoft are those where Lotus holds the throne. Lotus Notes bagged over half the votes to win the groupware application environment category; Microsoft Exchange, part of Windows 95, could muster only about a quarter of the votes. And even though Microsoft Mail comes with Microsoft Office, Lotus's cc:Mail for Windows remains unbeaten in the LAN e-mail package category.

But the victory that will really rankle Bill Gates is that of Intuit's Quicken 5, which trounced Microsoft Money in the personal finance category. Microsoft's

"OF THE THREE PROGRAMS TESTED ONLY UNINSTALLER DID NOT OFFER TO REMOVE CRUCIAL WINDOWS FILES."

— PC MAGAZINE ONLINE, FEB. 26, 1996
(After reviewing UnInstaller,™ CleanSweep® and Remove-It®)

Only UnInstaller™ from MicroHelp gives you absolute peace of mind to safely clean-up your hard drive. With its exclusive SmartLinks™ technology, UnInstaller performs an intelligent series of scans on your hard drive until it thoroughly understands the inter-relationships of files and programs. Without this technology, even an experienced user may find it easy to accidentally remove a crucial file.

Designed for Microsoft® Windows® 95

MICROSOFT® WINDOWS™ COMPATIBLE

Despite popular belief, Windows 95 applications aren't very thorough at automatically removing themselves from your hard drive. Regardless of which version of Windows you use, you need UnInstaller to continually clean things up. UnInstaller Works with both 16-bit and 32-bit applications.

And, as an added safety net, UnInstaller automatically compresses and backs-up everything it removes. So, as you clean off bits and pieces of old files, you can take comfort in being able to put things back exactly as they were with the simple click of a button.

Of course, with other deletion programs you can have the experience of getting rid of things you never meant to get rid of. Which may be good for us, but bad for you.

It's what you don't see on your hard drive that causes problems. Every application puts bits and pieces of itself in places you don't know about. Without UnInstaller, things can slow down — or come to a screeching halt.

Why take your chances with just any old clean-up program? UnInstaller is the No. 1-selling Windows utility on the market with more than a million copies sold.

PowerDesk, the highly acclaimed file management and desktop enhancement utility that truly unleashes the hidden power of Windows 95, is also a MicroHelp product.

1-800-922-3383

Available at your local software store.
MicroHelp is at www.microhelp.com

Circle 153 on reader service card

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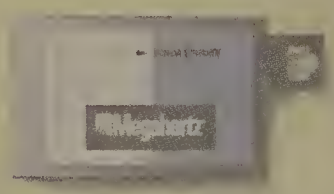
MicroHelp

HEY, EVERYONE CAN USE A LITTLE HELP.

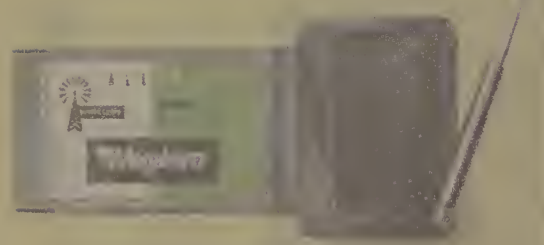
28.8 PC Card Modem With XJACK.

Cellular Direct Connect.
Digital Line Guard.
Home Office Implosion Avoidance.



PC Card Ethernet Adapter With XJACK.

28.8 Ethernet+Modem With XJACK.



AllPoints™ Wireless PC Card.

it is human
to return from a
with little soaps

it is human nature
luggage too big to fit in
under the seat in

it is human nature
office will implode if
for more than

We can help with
of human

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nature
business trip
and shampoos.

to carry on
the overhead bin or
front of you.

to think the
you're out of touch
two hours.

some parts
nature.

It is human nature to want to communicate at any time, from anywhere. And in this respect, the business traveler is just a bit more human than most.

With that in mind, Megahertz presents the 28.8 PC Card Modem. It's designed to be compatible with you and the way you work.

Our newest innovation, Cellular Direct Connect with Cable Sensor, lets you stay connected no matter where you are, without configuring hassles. The patented XJACK® connector means you'll never have to carry (or lose) another cable for the rest of your business-traveling life. And Digital Line Guard actually warns you if you're about to fry your modem by plugging into a digital PBX phone line. (We all know how bad frying things can be.)

The end result is you'll always be in touch. Of course, first you'll need to be in touch with us. Just call 1-800-LINKING, ext. 4555. Or find us on the Net at www.megahertz.com/patible.

Compatible with you.

Circle 138 on reader service card

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THE BASIC TOOLS

Utility Collection
Norton Utilities for Windows 95 (Symantec)

Windows Shell
Norton Navigator for Windows 95 (Symantec)

OCR Software
Caere OmniPage Pro 6.0

Shareware/Freeware
PKZIP version 2 (PKWare)

Backup Software
HP Colorado Backup for Windows 95

Program Language/ Development Tool
Microsoft Visual Basic v. 4.0

Forms Software
FormFlow 2.0 (Symantec/ Delrina)

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attempt to buy Intuit, foiled by the Department of Justice, was a de facto acknowledgment of Money's weakness. Intuit's QuickBooks won for accounting, while the company's TurboTax grabbed the tax planning/preparation category. Talk about the one that got away—and in a consumer and home-office market that Bill would love to get his hand on.

The Wide, Wide World of Computing

This year the center of the computing universe began its shift from your desk to somewhere out there in cyberspace. Who cares whether what you're doing out there is productive?

This time around we added a number of categories to acknowledge this momentous change. For the best Web site, our experts chose Yahoo, the most popular index to Internet attractions. Netcom, one of the largest of the companies providing a line to the Net, took nearly half the vote in the Internet service provider category and was the winner. And in our online service category, America Online for the first time unseated CompuServe, reflecting a shift from a service favored by nerds to one mostly geared to home users in search of fun.

The year's big winner also embodies computing's new wired perspective. It's no surprise that Netscape Navigator won for best Internet interface/utility. But the browser was also voted most promising software newcomer—not to mention the big kahuna of all, product of the year.

Some of our experts admitted that they gave Navigator the year's biggest honor because of Netscape's outrageous Wall Street performance. But others clearly had admiration born of experience. "I felt it was the kind of product that went beyond the hype. I see it as a product that is well thought out, very usable, and deserving of any accolades it gets," says Chester Freedenthal, a computer consultant in Alexandria, Virginia. Jim Porter, director of operations for Xplor International,

METHODOLOGY

We mailed ballots to 1900 *PC World* subscribers, consultants, computer professionals, and user group presidents and asked them to vote on the products that *PC World* editors nominated for World Class awards. When there was a difference of 1 percent or less in the number of votes a product received, we called it a tie. In write-in categories with fewer than 100 total votes, the winning product was required to have a lead of only one vote. (Write-in categories generally received a small number of votes among many products, which made it difficult for any single product to achieve a significant lead.) Thanks to *InfoWorld* for supplying the Computer Professional portion of the voting sample and to the User Group Connection for providing the list of user group presidents.

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an electronic document systems association in Torrance, California, agrees. "We've used other browsers, and Netscape's works the best," he says.

Navigator fits the definition of a World Class Award winner: a terrific product released at exactly the right time. But many of the other winners weren't so easy to pick. In an industry gone topsy-turvy, the big marketing machines work overtime, regardless of whether the products they promote merit the hype. This marketing monster may fool some of the people some of the time, but this year, at least, our experts ignored the shrill sales pitches and made some sharp calls. When you head out in search of the high-tech tools you need, keep the advice of our experts at hand. Maybe you can avoid being taken as a rube by the fast-talking hypesters of the digital age.

Eric Knorr is a contributing editor for PC World *and the editor and principal author of* The PC Bible *(Peachpit Press, 1995, 800/283-9444).* PC World *contributing editor Stephen Manes is a columnist for the* New York Times *and coauthor of* Gates: How Microsoft's Mogul Reinvented an Industry *(Touchstone/Simon & Schuster, 1994, 800/223-2348).*

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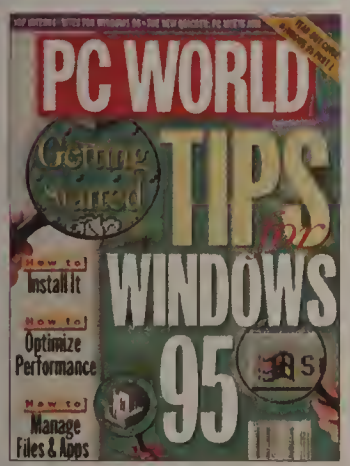

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THE NO-NONSENSE GUIDE TO INTERNET PROVIDERS

Don't be fooled by all the hype. Here's how to choose an Internet service provider you can count on.

Ever traveled around the world in 80 seconds? You will, as soon as you get Internet access. Then again, maybe you're already on the Net at work and want an account for home. Either way, you're sure to run into many confusing choices. Should you sign up with a large Internet service provider like Netcom or AT&T's WorldNet, or stick with an online service like America Online or CompuServe? Will a small provider in your hometown serve your needs? What about ISDN versus modem connection? You can study the subject and do your homework, but the longer you research the subject, the more confused you'll get (we know, we've been there). So forget trying to figure it all out. We've done the legwork for you, and we've come up with a few surefire recommendations.

By Yael Li-Ron

ROBERT NEUBECKER

We evaluated the services of hundreds of providers, large and small, and established some baselines for services, pricing, and availability. We also signed up with some of the top national providers and tested their service. Somewhere along the T1 lines and SLIP connections, we came up with a few guidelines on where to look, what to look for, what questions to ask, how to survive the jargon, and how to avoid road hazards.

Let's start with the basics. What do you need to connect to the Internet? A computer, a modem, and a phone line. We assume you already have these. What you're missing is an account with an Internet service provider, a company that provides access to the Internet.

If you're going online strictly to meet people, you should get your Internet access the old-fashioned way—through a commercial online service such as America Online, CompuServe, Prodigy, or Wow. The rich chat facilities, e-mail features, and forums these services provide are years ahead of what you can find on the Net. And as frosting on the cake, the online services all offer standard Internet access and tools. The downside: You pay significantly more for the value-added content than you would for "pure" Internet access (see "When Your ISP Is an Online Service").

Things to Ask an ISP Before Signing Up

- **Do you offer a flat rate (all-you-can-eat Internet)?**
- **How is technical support offered? By phone? E-mail? A list of frequently asked questions (FAQs)?**
- **Do you support ISDN? (After all, I may want to upgrade in the future.)**
- **Is a Web page included with the account?**
- **Do you have a piggyback option for other household members?**
- **Do you have a local access number?**
- **What kind of setup help (documentation, customer service, and so on) do you offer?**
- **Do you offer a proprietary browser or can I use any browser I like?**
- **Can I apply for a virtual domain through your service?**
- **Do you provide training for Internet novices?**

The National Providers: Too Big for Their Britches?

Throughout this article we refer to small and large ISPs, but those are pretty sweeping generalizations. Among small ISPs, some have a few hundred customers and others serve thousands; some are owned by individuals, others by groups of investors. The real difference is between *local* (sometimes called *regional*) and *national* providers. National ISPs have local access numbers in several states. Local providers have just a few, and in a limited area.

What's the allure of national ISPs? They offer local access numbers throughout North America, making them ideal for business travelers. They're owned and operated by corporations, carrying the promise of financial stability. But at what cost?

We asked several volunteers to sign up with national ISPs and report their findings. The satisfaction rate varied from provider to provider and from one part of each ISP to the next. But one complaint was consistent: Customer service leaves a lot to be desired. A SpryNet customer who wished to cancel his subscription had to dial a number in the 206 area code (there was no toll-free number, of course), then stayed on hold for 45 minutes. As for tech support, the consensus was that ISPs are growing too fast, and they seem to hire underqualified support staff. One tester reported the following conversation with a PSINet representative:

"Doesn't your browser support HTML tables?"

"H...?"

"...TML, you know?"

"Uh, dunno. Let me ask my supervisor."

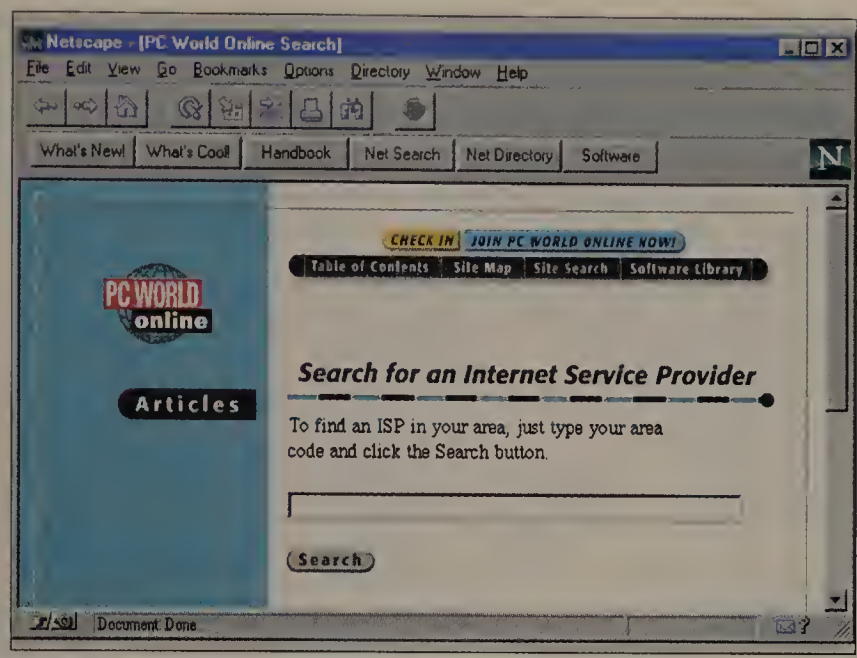
A tester who signed up with Concentric was put on hold for 45 minutes. It might have been even longer, but he chose not to stay connected to find out.

Another frustrating issue was the cryptic software. SpryNet's setup program didn't recognize the modem or the communications port, and the tester had to enter that information manually. Netcom's browser, Netcruiser, didn't offer security features, and our tester couldn't find any information on using Netscape Navigator instead. PSINet's Web browser displayed a seemingly corrupted file and promptly crashed.

The bottom line: Having survived a rocky start, our testers seem to like their services and intend to keep them—all but the two former Concentric customers and one SpryNet tester who's just too comfortable with America Online to change.

PERSONAL WEB PAGES don't get much better than this. SpryNet's Home Page Wizard is a unique tool in a world where users are usually left to figure out HTML on their own.

But we're assuming you want pure Internet service without the baggage. You want to browse the World Wide Web, participate in newsgroups, and send and receive e-mail without going broke in the process. So where do you start? Right here. Follow our ten steps to finding the perfect service provider for your needs, and you'll be up and surfing in no time.



FIND AN ISP ONLINE: Use PC World's ISP Finder (http://www.pcworld.com/july96/isp.html) to find providers in your area.

WHERE THE ISPS ARE. The Pacific Bell Yellow Pages ad campaign claims, "If it's not in here, maybe it doesn't exist." So turn to *I* for *Internet*, find a service provider in your area, and you're set. That was pretty easy, don't you think? Only there's no such entry in the Yellow Pages. And a search under Communications yields nothing. Ditto under Computers.

There are thousands of Internet service providers in the United States; you just have to know where to look. Start with the table below; even better, if you already have Internet access, go to the ISP Finder area on the PC World Online Web page (http://www.pcworld.com/july96/isp.html) and type your area code in the Search box. Or send e-mail to isp-###@pcworld.com, substituting your area code for the ###. (For example, isp-803@pcworld.com return a listing of providers in the 803 area code.) Or post a message on the newsgroup alt.internet.services asking for recommendations for service providers in your area. For a less high-tech solution, check the ads in any

National Providers: Find the One That Best Serves Your Needs

● = Yes ○ = No

	Flat rate	Virtual domain	Personal pages/space	Proprietary software	Extras	Reader service number
Concentric 800/745-2747 http://www.cris.com/	$29.95	○[1]	●/5MB	○	First month $1. Services for online gamers. Free access to BBSs. Netscape Navigator included.	631
EarthLink 800/395-8425 http://www.earthlink.net/	$19.95	●	●/2MB	Total Access	620 local servers, many more than its competitors. Free telephone and online support; 1 free month when you refer a friend. Lets you play the CD-ROM game Spycraft.	632
GNN 800/819-6112 http://gnn.com/gnn/GNNhome.html	○	●	●/20MB	GNNworks GNNmessenger GNNpress	20 free hours when you sign on a friend. Netscape Navigator included (summer 1996).	633
Microsoft Network 800/426-9400 http://www.msn.com/	○	○	○	○	Most of its rich proprietary content available to nonmembers, but some areas restricted to members only.	634
Netcom 800/353-6600 http://www.netcom.com/	$19.95	○	●/1MB	NetCruiser	First month $5. Unlimited weekend access. Free 24-hour technical support.	635
PSINet 800/827-7482 http://www.usa.pipeline.com/	$19.95		●/500K	Pipeline	First 14 days free.	636
SpryNet 206/957-8997 http://www.sprynet.com/	$19.95	○	●/5MB	SpryNet	15 hours daily phone support; 24-hour support via chat room. Internet Explorer included (summer 1996).	637
WorldNet 800/967-5363 http://www.att.com/worldnet/wis/	$19.95	○	○	○	5 free hours per month until March 1997 for residential AT&T customers, or $19.95 flat rate. Parental lock.	638

[1] Will be available this summer.

Sample Java at a Cybercafé

Cyber Café, New York

Muddy Waters, San Francisco

WHAT'S HIPPER THAN AN ESPRESSO BAR? An espresso bar with Internet access. Cyber Café on New York's Lafayette Street has PCs for Web browsing. Muddy Waters on San Francisco's Church Street is part of SFNet, a network of cafés that offer limited Internet access via coin-operated terminals.

local newspaper or computer tabloid.

Once you have a list of companies that provide Internet access in your area, you can determine which one is best for you by process of elimination. Read on.

ASK FOR A DIAL-UP ACCOUNT.

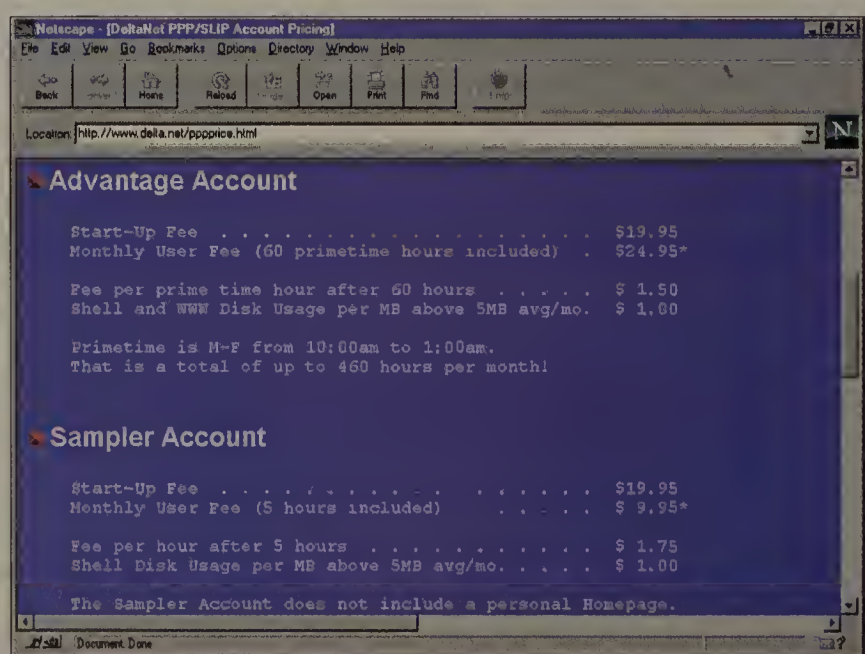
Before you sign up, you need to know what you want. Any ISP you call is likely to ask you a series of questions that will sound like mumbo jumbo: Do you want a SLIP/PPP account? A shell account? (See "Understanding Online Jargon" for more information.) Don't sweat the terminology. Unless you have a business that can afford an expensive, ultra-fast 56-kbps "leased line" or a T1 line, you'll want a *dial-up account*—an Internet account that lets you use your modem to make a connection. So start by asking the providers for a dial-up account; the ISPs may refer to it as a SLIP/PPP account, but that's *their* business.

GET A FLAT RATE.

Next you need to think about money. In preparing this article, we polled hundreds of ISPs about their services, availability, and pricing. In response to our question about prices, the most common reply was something like "Are you kidding me?" Some providers have fee schedules so complex they require a degree in accounting to sort out. Let's see: $20 a month for the first 15 hours, then $1.50 for each additional hour, and $5 if you exceed 100 e-mail messages, plus $5 for a Web page; storage space for your graphics is extra. Forget it. Just say no to this sort of scheme. Our advice: If an ISP doesn't offer a flat rate, look elsewhere. A flat rate should be between $20 and $30 a month, and it should include all-you-can-eat Internet: a dial-up account, e-mail, and space for a Web page. Some providers limit their fixed-rate usage to 75 to 200 hours, which is quite reasonable. Do the math: More than 2 hours a day—that's almost as good as unlimited use.

As for the start-up fee, some ISPs think they're the only game in town and charge $50 or more for the privilege of setting up an account with them. At the risk of alienating hundred of ISPs, let us say this right now: There's no justification for this tactic. Look for a provider that offers free hookup *and* a free trial period. Remember, you're the one making the financial commitment, not the provider.

Some service providers try to lure you with offers you can't refuse. AT&T's WorldNet, for instance, provides 5 free hours to all residential AT&T customers, which sounds hard to pass up. But after the first 5 hours the meter will be ticking to a beat of $2.50 per hour. That hurts. And trust us, you'll run out of your allotted time after one week. Luckily, WorldNet also offers a flat rate of $19.95.



LIFE'S TOO SHORT. IF YOU NEED AN ACCOUNTANT TO DECIPHER the ISP's convoluted pricing scheme, go elsewhere.

Other household members want to get on the Net? You might not need separate accounts. Some ISPs will let you "piggyback" a second or third person (with their own unique e-mail handles) on your account for a nominal fee.

AVOID TOLL CALLS.

Toll calls are the hidden cost of Internet connections. Even with a flat rate, you can end up with phone bills of hundreds of dollars a month if you're not careful. Look for an ISP that has a local access number.

The larger national providers cover most metropolitan areas but tend to neglect small, rural communities. Craig Sauvigne of Rock Hill, South Carolina, wanted an Internet account for research and leisure, but the closest access numbers for America Online, CompuServe, and Netcom were in Charlotte, North Carolina. Sauvigne and the rest of Rock Hill aren't cut out of the Internet loop, though: Local provider CetLink (http://www.cetlink.net) is servicing that small college town with local access numbers, multiple users per account, and a flat rate to boot.

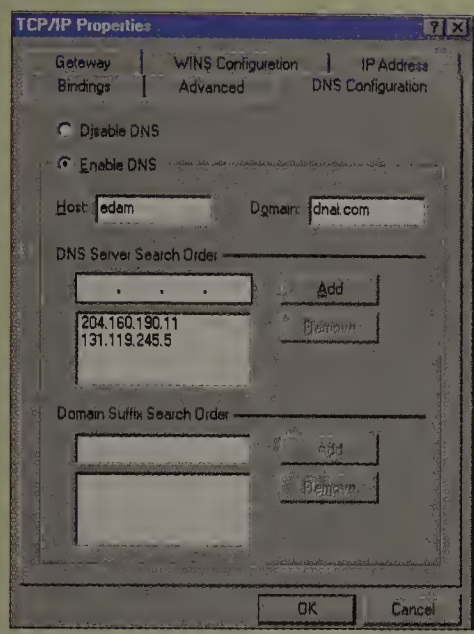
And what about 800 numbers? Many ISPs advertise this

LEFT, JOHN ABBOTT; RIGHT, JAY BLAKESBERG

Understanding Online Jargon

If you want to learn the language of the natives, start with the alphabet soup—you know, those mysterious acronyms and technical terms that ISPs insist on using instead of plain English.

The mechanism that controls your Internet connection is called a *protocol*. To make a successful connection to the Internet, your computer needs TCP/IP, which is the standard Internet protocol. TCP/IP is integrated into Win 95, but Windows 3.*x* users need to install this software on their systems. If you've got a dial-up connection (that is, you're using a phone line), you also need a dial-up protocol; ISPs will provide you with the software and protocol. The two common Internet dial-up protocols are *SLIP* and *PPP*. SLIP, which stands for Serial Line Internet Protocol, is gradually being replaced by PPP, Point-to-Point Protocol. For one thing, SLIP doesn't support ISDN.



SLIP? TCP/IP? Huh? Windows 95 understands the technobabble. Tell your provider that you're running Windows 95, and ask for directions for configuring your system, as shown here.

So if you see a provider advertise its SLIP/PPP accounts, it's not an either-or proposition. If you're looking for a dial-up account for personal or small-business use, your only choice is PPP. It's as simple as that. But really, you shouldn't have to even think about protocols, just as the water company doesn't ask its customers which pumps to use.

Some ISPs offer *shell accounts*, which do not have SLIP/PPP. A shell account lets you access the ISP's server directly, so you can interact with it in a deliciously cryptic "character mode." Okay, some people may enjoy typing commands such as *awk* or *grep* (gesundheit!), but most mortals should be spared this dubious pleasure. So why would anybody want a shell account? If your provider has only a local access number and you're on the road often, you can use telnet software to access your account from a remote system, check e-mail, update your World Wide Web page, and so on. (Telnet is a UNIX utility for remote access.)

TIP Windows 95 comes with built-in support for PPP, leaving you with one less step to worry about when you install your Internet access software. You can also use the Inbox for Internet e-mail. Let your service provider know that you're using Windows 95, and ask for specific installation instructions.

And, lest we forget, POP stands for Point of Presence, which is a fancy way of referring to the server's location. If you hear that Mayberry has a local POP, that means there's a local access number.

Do we really need to know all these terms? Marketing-savvy ISPs know the answer to that one. They advertise their wares as dial-up accounts. But they may ask you confusing questions when you call to order service, so it's good to be prepared.

TIP How do you get on the Internet when you're on the road? If you have a shell account, you can go to a cybercafé (see "Sample Java at a Cybercafé") or a public library that offers Internet access, and use telnet from those sites. Note that some ISPs don't offer shell accounts at all, and others offer a shell-only option.

toll-free access, which sounds like the perfect solution for the frequent flier until you discover that they charge extra for this service. At $10 per hour for 800 number access, you might as well make that long-distance call to the closest local access number.

GET A FAST CONNECTION.

The next item on your shopping list is the connection type. The cheapest and most practical way to go is a 28.8-kbps modem. (If you still have a 14.4-kbps modem, it's time for an upgrade.) The fastest route available to home PC users and small-business owners is ISDN—a digital phone line potentially four times faster than a 28.8-kbps modem. Most telephone companies are offering ISDN services, but setup and configuration still cause many headaches. Expect to pay more, too. In addition to the initial investment in an ISDN terminal adapter (sometimes referred to as a "digital modem"), service providers charge more for this type of connection. Your phone company may also charge a hefty tariff both for installing ISDN and as a monthly maintenance fee. But as the adage goes, time is money, and a faster connection will free you to, well, waste more time visiting weird and wonderfully pointless sites.

Though ISDN is an attractive technology, we don't recommend that you go all out yet. If this is your first venture into ISP-land, get a standard modem dial-up account, work out the kinks, get used to it, and later consider upgrading to ISDN. You don't want to go through two potentially traumatizing experiences at the same time.

INQUIRE ABOUT PERSONAL PAGES.

Do you have a hankering to create your own Web page? After all, everyone else seems to have one nowadays. Then make sure your ISP offers some form of personal page service, whether for additional fees or as part of the account—preferably the latter. If you plan on including graphics and multimedia elements on your site, look for a provider that will give you some server space (5MB seems to be the norm) at no extra cost.

SECURE A VIRTUAL DOMAIN.

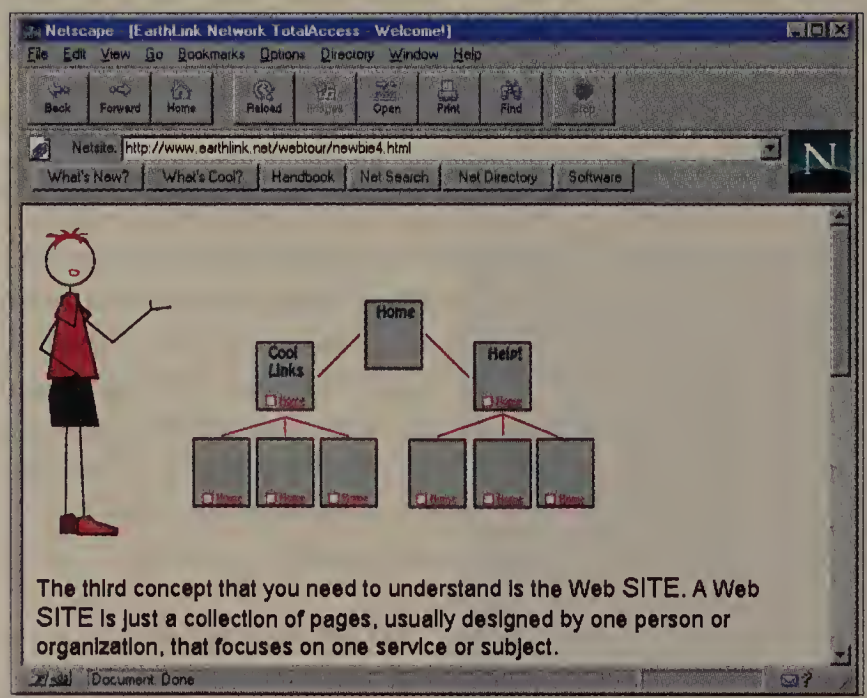
Most providers will give you an e-mail address that looks something like yourname@the_isp's_name.com. If you're a small-business owner, you may

want to replace the domain name (the part after the @ sign) with the name of your own business or organization, which has two significant advantages: It gives your business the appearance of a larger organization, and it's yours to keep for as long as the Internet is around. Even when you change ISPs, your domain stays with you. Ask your provider if you can apply for a "virtual domain." The ISP will apply on your behalf with InterNIC, a centralized office that governs the domain names on the Internet. The InterNIC application fee should cost no more than $100. (Some ISPs don't add a surcharge to InterNIC's fee.) In many states you pay as much for a custom license plate, so this isn't such an extravagance. Note that you'll need to pay a $50 annual maintenance fee to InterNIC for as long as you hold on to that domain name.

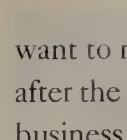
GET THE BEST SOFTWARE.

Your service provider should outfit you with all the software you need to get and work online. In addition to the driver/protocol software (Winsock, TCP/IP), you need the following tools, at the very least:

Web browser. If the ISP offers a proprietary browser, find out if your account will support third-party offerings. Don't settle for less than industry standards Netscape Navigator and Microsoft Internet Explorer. (Note: IDG, *PC World*'s parent company, owns stock in Netscape Communications.)



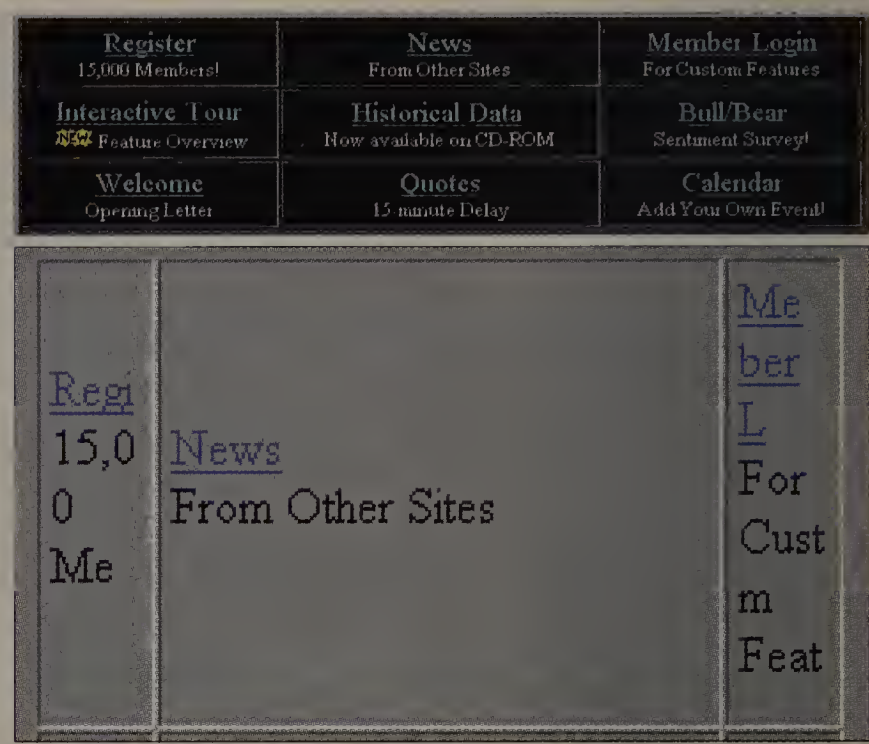
WANT TO LEARN ALL ABOUT THE WEB? Some ISPs go all out to teach you what you need to know. EarthLink may be talking down to most people, but if you're a total novice, there's no such thing as too simple.



Don't sign up with any ISP that doesn't let you mix and match software at will. If you're forced to use the provider's own tools, get another ISP.

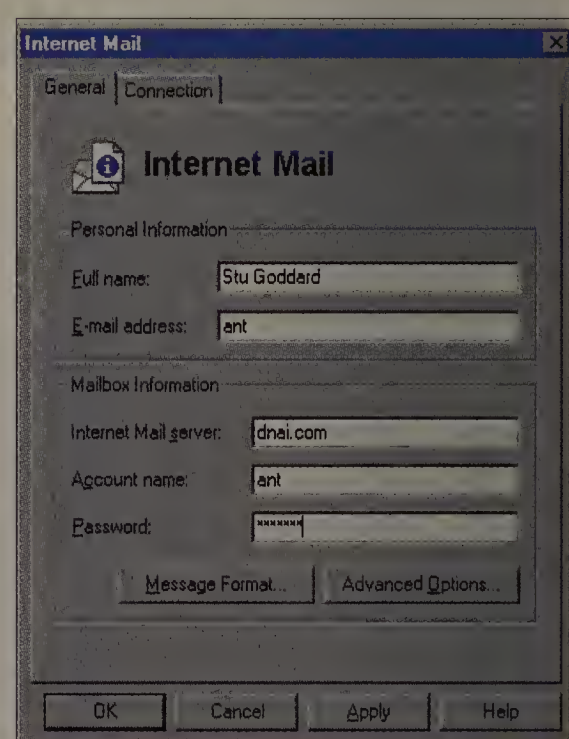
Mail client. In computerspeak, a *client* is an application that communicates with a corresponding program on the *server* side. Your e-mail resides on the ISP's server, and you read and write it with a client. The most popular one is Eudora. If you don't like the mail client your provider gives you, take our advice and download Eudora Lite from PC World Online's site and see if you like it better. It's free. If you're using Windows 95, you can configure Exchange to handle your mail.

No matter how reputable your provider is, your e-mail may be read by less-than-scrupulous employees. Even if you erase your incoming mail immediately upon receipt (which is an option you can set in Eudora Lite), it may have already been backed up to tape as part of a regularly scheduled server backup, and anybody can read it if they put their criminal mind to it. To secure your e-mail, you might want to consider using the modestly named Pretty Good Privacy, an e-mail encryption program. You can find out more about the much-acclaimed PGP on the Massachusetts Institute of Technology's Web site (http://web.mit.edu/network/pgp.html). While you are there, you can download this powerful program, which is free for noncommercial use.



SOME ISPS INSIST ON REINVENTING THE WHEEL. On the top is an example of how Netscape Navigator views a table from The Silicon Investor (http://www.techstocks.com/) as compared to Netcom's proprietary browser, Netcruiser, on the bottom.

Newsreader. Usenet newsgroups require special software; an e-mail client won't do. Ideally, your newsreader would be an offline reader that retrieves newsgroups messages (called *articles*) and then disconnects, letting you read and reply when you're not paying for the connection, and freeing your phone line for your teenagers. Netscape Navigator



IF YOU'RE USING WINDOWS 95, configuring Exchange's Internet Mail to send and receive e-mail through your ISP is as simple as filling in the blanks in this dialog box.

When Your ISP Is an Online Service

Before you run out and sign up with an ISP, make sure you wouldn't be better off browsing the Internet via America Online, CompuServe, Prodigy, or Wow. For some people, one of these commercial online services may be the best option. Of course, you'll be using that service's proprietary interface, fiddling with a proprietary e-mail system, and paying more money per month than a standard ISP might charge. But you also get boatloads of structured content found only within the confines of that service.

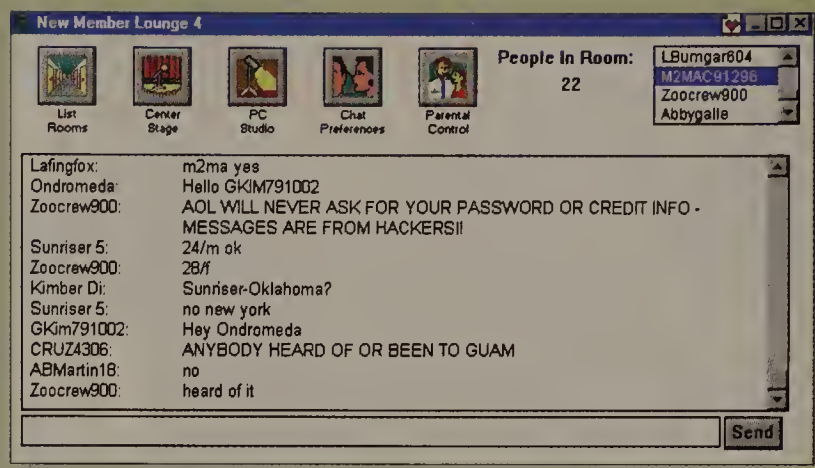
And the quality of the online services' Internet offerings, once substandard, is improving as well. AOL and CompuServe, for instance, are scheduled to bundle Netscape Navigator and Microsoft's Internet Explorer with their new releases, so surfers will be able to use the browser of their choice. All the services are embedding hypertext links to the Web within their own content. They're also providing subscribers with complete access to all parts of the Internet, from newsgroups to the Web. Best of all, the personal page tools on all four of these services are superb. They require no expertise in Hypertext Markup Language, FTP, or any cryptic UNIX process. Just select options in a wizard or fill in a form, and you've got yourself a Web page. Only a handful of ISPs we looked at offer this service.

Nor can the Internet providers beat the two cards the online services have up their virtual sleeves: chat and online shopping. If you like going online to meet other people and chat your lunch hour away, it's hard to beat AOL's chat services, with its many "rooms," instant messages, and private chat facilities. (The Net equivalent, IRC, is clunky and hard to use.) As for shopping, reports of security flaws in Netscape's browser are keeping many potential shoppers away from Internet malls, while online services—because they are closed networks—have a reputation for being secure.

Essentially, the online services are trying to provide the best of both worlds—sort of like ISPs with value-added content. Unfortunately, not one of them offers a flat-rate package, making them a lot more expensive than their sign-up fees would lead you to believe. G. S. (name withheld on request) of Portland, Oregon, was shocked to receive a $150 bill from America Online. The "free" 10 hours she got with AOL hardly covered one week's worth of online activity, which includes going online to chat and meet new people. And G. S. is not alone. A quick cruise down some message threads on the newsgroup alt.aol-sucks has revealed that her experience is quite common. (She has since switched to Netcom, thank you for asking.)

If your experience matches G. S.'s, head straight for a conventional ISP. But if you can't live without structured forums, databases, or chat and don't plan on spending lots of time cruising the Web, online services are a reasonable alternative.

Look for an in-depth review of online services in our August issue. Until then, see the table below for some suggestions.



WANT TO CHAT WITH STRANGERS about the weather in Guam? You can't beat the online services' chat facilities (shown here: an AOL chat room). If this kind of activity is your primary reason for getting wired, don't go with an ISP.

America Online
800/827-6364
Pricing: $9.95 with 5 free hours
http://www.aol.com/
Reader service no. 685

CompuServe
800/433-0389
Pricing: $9.95 with 5 free hours
http://www.compuserve.com/
Reader service no. 686

Prodigy
800/776-3449
Pricing: $9.95 with 5 free hours or $29.95 with 30 free hours
http://www.prodigy.com/
Reader service no. 687

Wow
800/943-8969
Pricing: $17.95 flat rate, first 30 days free (unlimited time)
http://www.wow.com/
Reader service no. 688

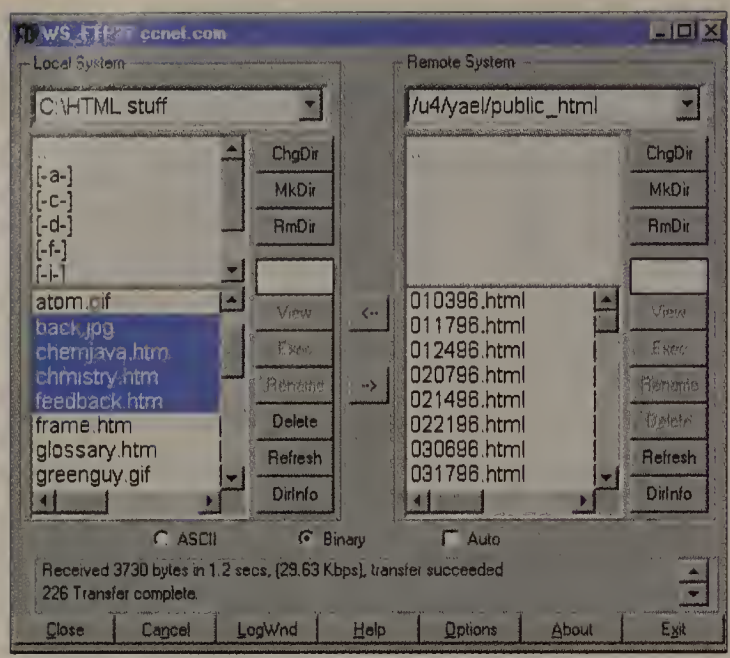
WHICH ONLINE SERVICE IS FOR YOU?

What's important to you	Your best bet
chat	AOL, Prodigy
content for children and families	AOL, Prodigy, Wow
databases	CompuServe
e-mail	AOL, CompuServe
forums	CompuServe
personal Web page	AOL, CompuServe, Prodigy

and Microsoft's Internet Explorer both offer built-in readers. They're not offline readers, but they are integrated with your software.

IRC client. Internet Relay Chat is a tool that allows you to tap out real-time conversations with other similarly equipped people. IRC is no match for AOL's chat rooms; it's clunky and cryptic, but popular with the Internet chat set. Unlike other tools listed here, it's hard to recommend an IRC client, because none of the ones we looked at were worth a thumbs-up.

FTP software. File transfer protocol is a tool for moving files between different computers on the Internet. If you plan to have a Web page, FTP is the most crucial piece of software in your possession, because it lets you *upload*, or post your files to the server.



OUR FAVORITE FTP CLIENT, SHOWN HERE, IS WS_FTP32, the Windows 95 version of ws_ftp. It lets you upload files to your Web server and do some basic file management on that site.

The best version around is Winsock FTP. If you get a different one, download ws_ftp from PC World Online's Web page.

CHECK OUT THE QUALITY OF CUSTOMER SERVICE.

You're almost home. You've identified an affordable ISP that offers a reasonable palette of software. Now for the hard part: evaluating customer service and support. Without a bit of sleuthing, you may not know how bad the service is until you're cut off in the middle of an important e-mail transmission and the best your ISP has to offer to calm your nerves is a tape loop of "The Wind Beneath My Wings."

Ask the ISP for some prequalifying information, such as the number of support persons on staff, their hours, and so on (see "Things to Ask an ISP Before Signing Up"). A few providers offer real-time interactive bulletin boards to reach their support staff, but the most common ways to get help are by phone and e-mail.

A common problem occurs when the ISP's server is down and customers think that something is wrong with their own systems. Ask the provider if there's a hot line or any other way to find out whether the server is down. Many ISPs post their announcements in newsgroups (such as alt.internet.services or different regional ones). But if you can't log on, a newsgroup won't do you any good.

Also make sure the ISP can give you sufficient help as you install the software and become familiar with the system. If all the provider has to offer is a disk, look elsewhere. You want documentation, and you want it as hard copy. If the setup and configuration instructions are online, they're not going to be of any help. The start-up kit should also include a troubleshooting guide.

Word of mouth is your best screening tool. When you consider an ISP, log on to the Web using a friend's account or from a cybercafé (see "Sample Java at a Cybercafé"), and go to that provider's site. Most ISPs list subscribers' pages on their home page, so check out these links and contact their owners to find out how they like the service.

EXERCISE YOUR OPTIONS.

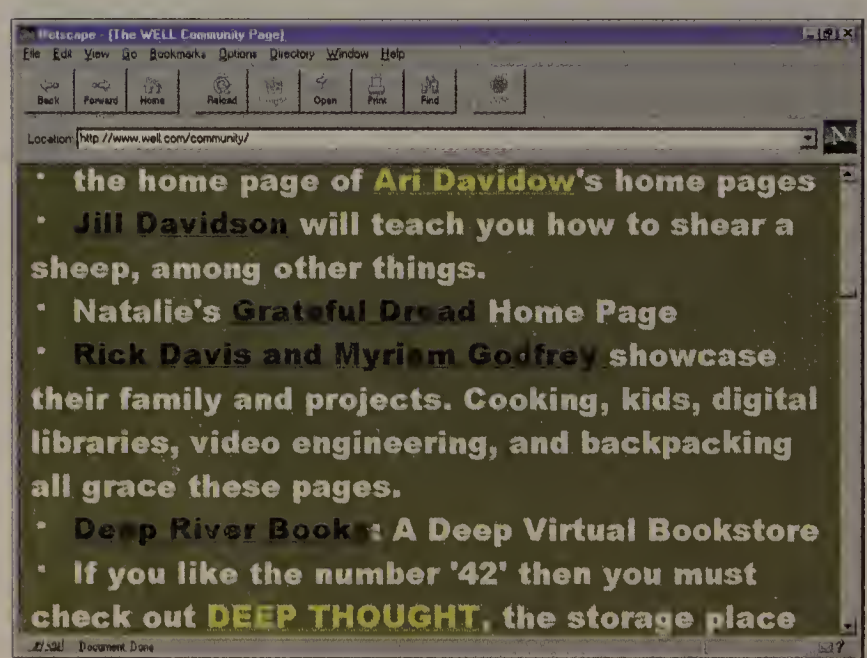
Sometimes, despite all your prescreening, you'll be unhappy with your ISP: The server is down too often, the access number is always busy, the customer support staff knows even less than you. Just bail out and go elsewhere.

Look for an ISP that offers a free trial period with an easy bail-out option. A 10-hour trial seems to be the minimum.

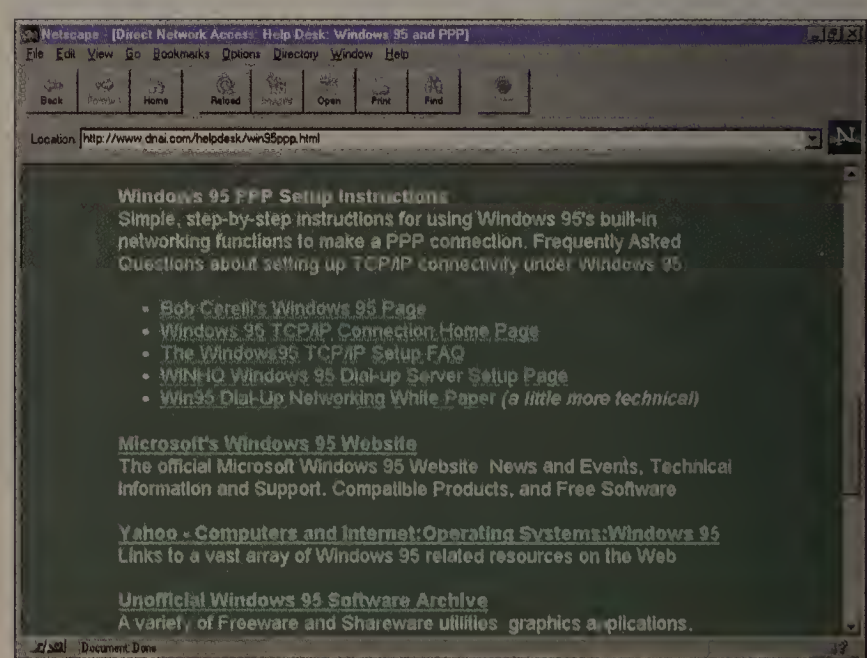
Yes, by changing ISPs you'll get a new e-mail address and will need to give it to all your friends and colleagues. But if you have a virtual domain, it will stay with you. Another option is to sign up with an e-mail forwarding service such as Pobox (http://www.pobox.com/). It costs as little as $15 per year, and the first three months are free.

The bottom line: Internet access is a very competitive market, with lots of providers fighting over little old you. Take advantage of that fact to get the best deal possible.

PC WORLD online *The files mentioned in this article are on PC World Online. Yael Li-Ron is a* PC World *senior associate editor and coauthor of* Windows 95: Making it Work for You *(ZD Press, 1995, 800/858-7674).*



PEOPLE GO ON THE WEB FOR TWO REASONS: to see and to be seen. A good ISP should offer space for a home page and give you exposure the way that The Well (http://www.well.com/community) does.



ISPS SHOULD OFFER COMPREHENSIVE ONLINE and offline support, like this example from Berkeley, California–based Direct Network Access (http://www.dnai.com/).

Tomorrow's Technology Today!

THE MICRON™

Unleashing up to 166MHz of Pentium® processor power, the Micron Millennia™ surpasses established benchmarks to create a whole new level of unbridled computing performance. Continuing to triumphantly sweep the PC industry's most coveted awards, the Micron Millennia line was recently recognized with *PC Magazine*'s "Best Products of 1995" award.

intel inside pentium PROCESSOR

PC MAGAZINE BEST OF 1995

January 9, 1996
MILLENNIA

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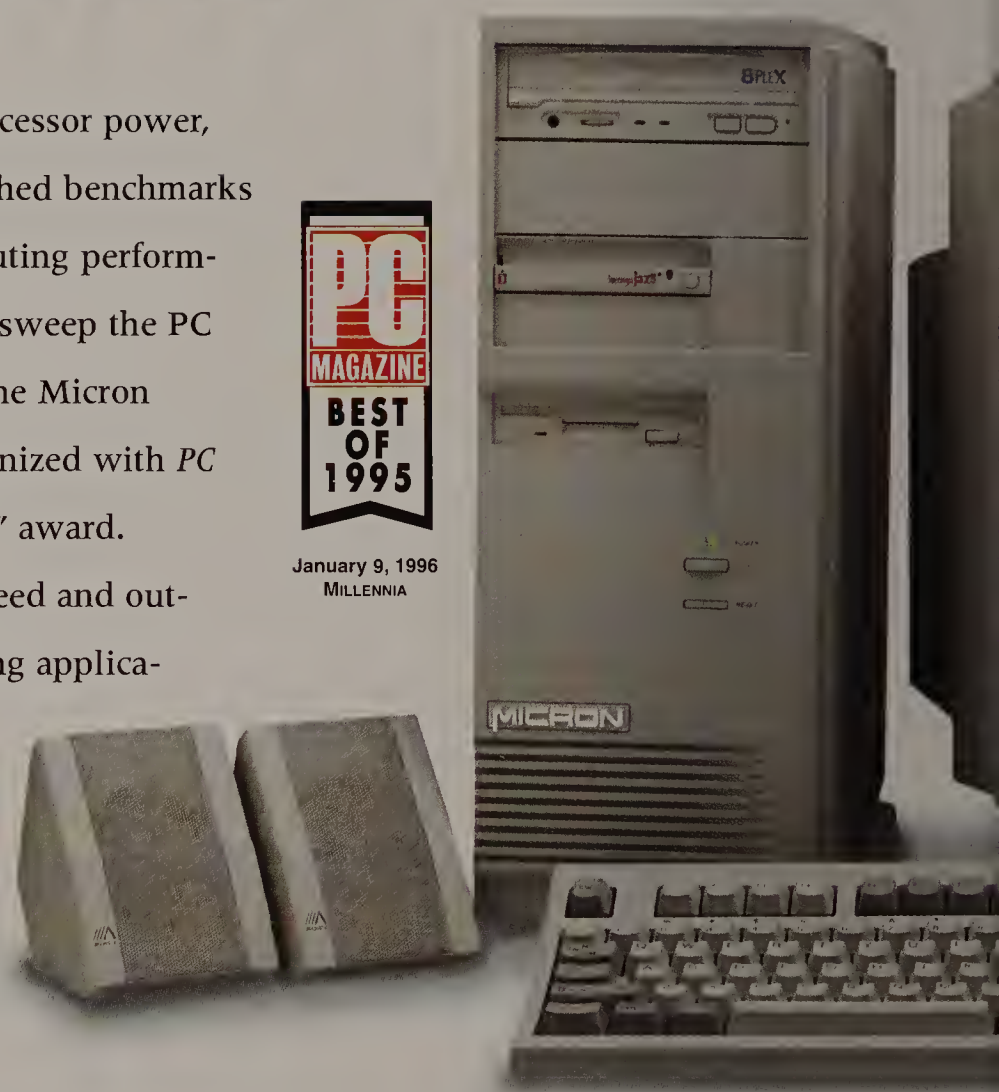

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- PCI 32-bit Ultra SCSI Fast-20 controller
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- Microsoft Mouse, 104-key keyboard
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- 15" Micron 15FGx, .28dp (13.7" display)
- *Tool-free* mini-tower or desktop
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- **Microsoft Home Pak includes:** Works 4.0 for Windows 95; Publisher Deluxe for Windows 95; Encarta® 96; Encarta 96 World Atlas; Music Central™ 96; Wine Guide; Arcade 1.0; Scenes–Sports Extremes Collection; Cinemania® 96; Julia Child Home Cooking; Best of Windows Entertainment Pack; CD Sampler (includes Fury³ game demo)
- 5-year/3-year Micron Power℠ warranty*

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- With 133MHz Pentium processor.....add **$100**

HOME MPC P166

net ready

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- *Tool-free* mini-tower or desktop
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- Microsoft Windows 95 CD & MS Plus! CD
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- **Microsoft Home Pak includes:** Works 4.0 for Windows 95; Publisher Deluxe for Windows 95; Encarta 96; Encarta 96 World Atlas; Music Central 96; Wine Guide; Arcade 1.0; Scenes–Sports Extremes Collection; Cinemania 96; Julia Child Home Cooking; Best of Windows Entertainment Pack; CD Sampler (includes Fury³ game demo)
- 5-year/3-year Micron Power warranty*

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- Iomega Ditto 3200 (1.6/3.2GB) Travan Tape back up w/tape $299
- Conner 4/8GB DDS-2 DAT SCSI Tape back up w/tape .....$999 **

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- Diamond Stealth64 video card w/2MB VRAM.....$150 †††
- Diamond Stealth64 video card w/4MB VRAM.....$300 †††
- #9 Imagine 128 video card w/4MB VRAM.....$500 †††
- #9 Imagine 128 video card w/8MB VRAM.....$750 †††

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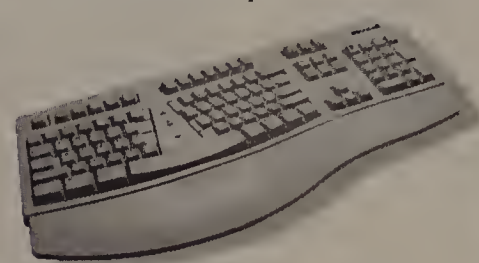
- APC Pro7T surge suppressor $69
- Microsoft Natural Keyboard $49



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- 3COM 3C509 Ethernet ISA NIC (BNC, AUI & RJ-45) $99
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Circle 149 on reader service card

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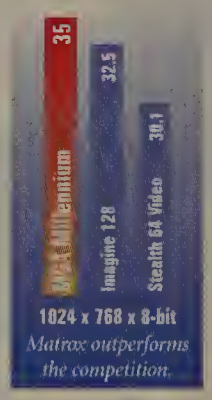

Not only do you get blazing fast performance for Windows, video playback, 3D and DOS, you also get Sonnetech's superior color calibration utility and Matrox's new *Desk Navigator*. Sonnetech's color calibration software incorporates Kodak's Precision Color Management System™ so you can match the colors on your monitor perfectly with final printed output. And with Matrox's new *Desk Navigator* utility you can dynamically scroll around a virtual desktop of 2048 x 1536. Also included is optimization and support for 175 monitors and over 20 additional productivity features for Windows 95™ and Windows NT™.

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* Estimated street / selling price for the 2MB version. Windows 95 tests conducted by Matrox Graphics Inc. using Ziff Davis' Winbench 96 on an Intel Endeavor motherboard configured with Intel P5-166MHz, 32MB of EDO DRAM and 512K cache at 1024 x 768 in 256 colors, 72 Hz, large fonts under Windows 95 The Matrox MGA Millennium and Diamond Stealth 64 Video were were configured with 2 MB of memory, and the Number Nine Imagine 128 was configured with 4 MB of memory, for the PCI bus using driver releases 2.30, 4.02.241 and 2.08 respectively.

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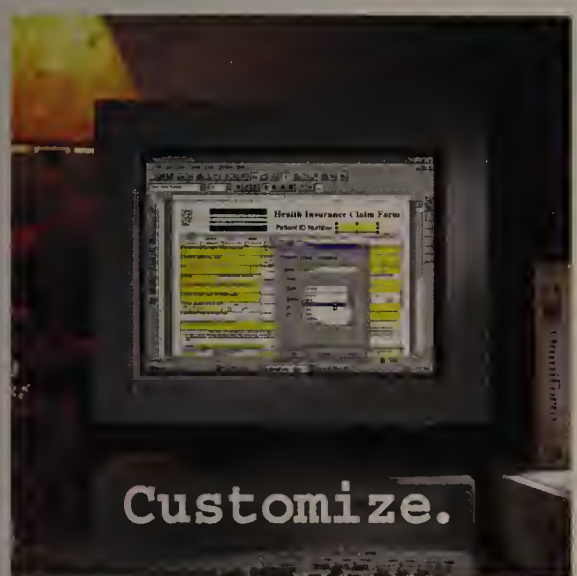

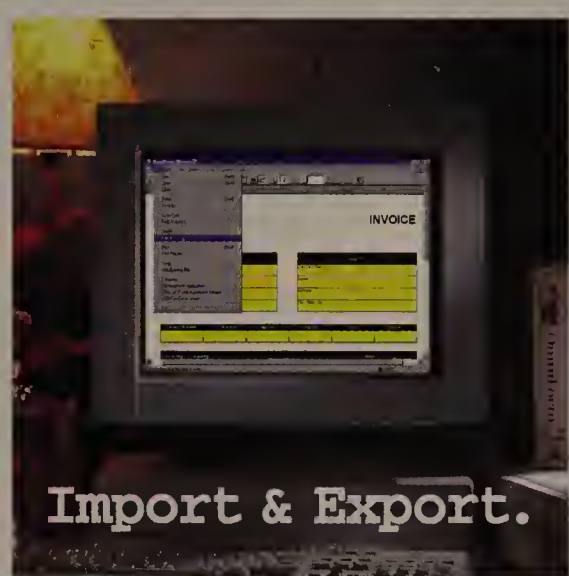

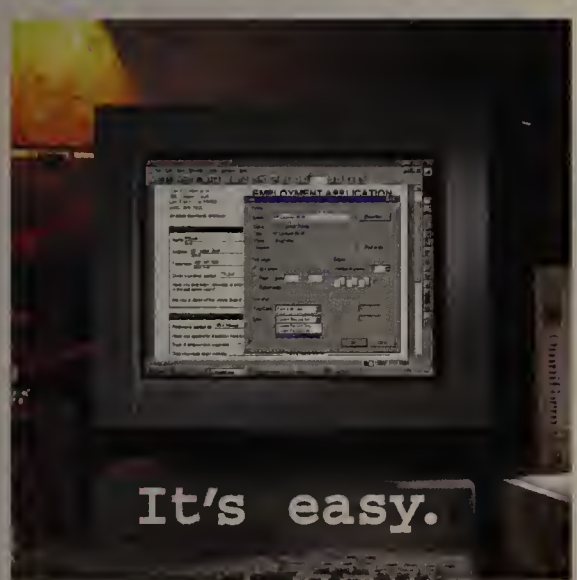

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Circle 40 on reader service card

Databases Step Up to Windows 95

BY CELESTE ROBINSON

Most of us use some type of database every day—a Rolodex of names and numbers, a spreadsheet of expenses, lists kept in a word processing document. But few of us ever create a "real" database application, one with data entry forms, query tools, and report generators. The reason is simple: Databases are hard and usually require the help of a professional database developer. For the most part, users aren't in charge of a database the way they are with word processors or spreadsheets. But a new breed of database management systems promises to change all that by introducing tools that make users more self-sufficient than ever before.

In the last few years, each new wave of database management software has claimed to have two advantages: The programs are easy enough for novices to create simple relational applications quickly and painlessly, yet powerful enough for programmers to develop complex applications. Most of the latest Windows 95 databases are no exception. In this review, we look at four packages that promise to turn database rookies into instant developers: Microsoft's $339 Access 7.0, Lotus's $105 Approach 96, Claris's $199 FileMaker Pro 3.0, and Borland's $299 Paradox 7. A fifth product, Alpha Software's Alpha Five, would have fit nicely into this group, but the package did not ship in time for this review (see "Alpha Hits the Fifth Dimension").

Can the latest Windows 95 databases put you in charge of your data, or do you still need to rely on the expertise of professionals?

We concentrated only on the tools novices are supposed to be able to use to create, manage, view, and analyze a database without writing code. So we didn't try out the programming languages or other high-level features in any of the four packages. We also stayed away from the high-end products like Visual dBASE and Visual FoxPro. Despite their enhanced visual development tools, they're still just that: development tools.

We ran each of our four contenders through a gauntlet of tests in the PC World Usability Lab, focusing on the basics: table creation and modification; data importing; queries; and form and report creation (see "How We Tested Usability").

Bottom line? Don't fire the pointy-headed database developer yet. For complex, mission-critical applications, you still need an expert. If your needs are simple, though, there's a lot of good news. The templates

ILLUSTRATIONS: JOSE CRUZ

Best Buy

Approach was the database our usability testers felt most comfortable with. It received praise for almost all the features we tested (see Usability Test Scores). It's well equipped for the power users who develop workgroup applications, yet it knows how to hide its brawn behind a friendly face, so beginners can get up and running in a reasonable time. The only problem we noticed: Approach tries a little *too* hard to be friendly. Some of the plain-language terms that it uses for standard database functions confused our experienced testers.

and application generation tools in some of these databases have improved to the point where a greenhorn can put together a basic but fully functioning application.

Approach was our usability testers' favorite, hands down. They found it the least intimidating and the most intuitive. Access and FileMaker Pro tied for second place. Our testers were impressed by the sheer volume of help available in Access, but when it came to doing the work, Approach proved easier to use. What Approach and FileMaker miss in on-screen help, they make up for in intuitive interfaces, while the converse seems true of Access.

Paradox came in a distant fourth—for a database beginner, it's a bad choice. Even with its excellent Experts, its user interface is confusing. But if you're a seasoned Paradox user, we recommend you stay with what you know and upgrade to Paradox 7 to take advantage of its 32-bitness, support for OLE 2, and multithreading capability.

What a Difference a New OS Makes

On the whole, the Windows 95 versions of these programs are minor evolutionary steps. True, they're all 32-bit apps, but the practical implications of this may be lost on most users, except for multithreading, which lets you print in the background while sorting a table, for example. One notable change: Access now supports the Windows 95 Briefcase, which lets mobile users replicate data between a notebook and a desktop record by record, rather than having to copy entire databases between systems.

Most striking, though, is the extent and quality of on-screen help in all four products. Not only are their static help files better than any manual, but the many interactive help agents let users create applications without a degree in computer science.

All four of these packages come with numerous templates (prefab applications) that you can use as is or tweak to your liking. All of these packages have tools that you can use to add custom buttons to forms.

Hope for the Uninitiated

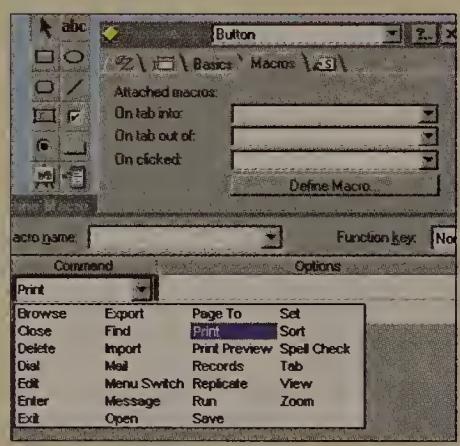
Will any database ever be as easy to use as a word processor? Until recently, we wouldn't have bet on it. But then we saw Wall Data's Salsa (Salsa for the Desktop, previewed in May's *New Products*). Salsa is reinventing the way users manage information (see "Salsa Is Hot, Hot, Hot").

Celeste Robinson is a contributing editor for PC World. *Usability testing supervised by Jeff Kuta; performance testing conducted by Kevin Mitchell and Susan Silvius.*

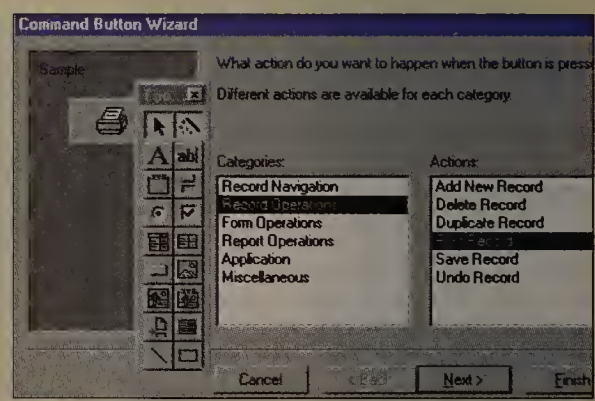
For more information about all products in this article, circle reader service no. 914.

Cute as a Button

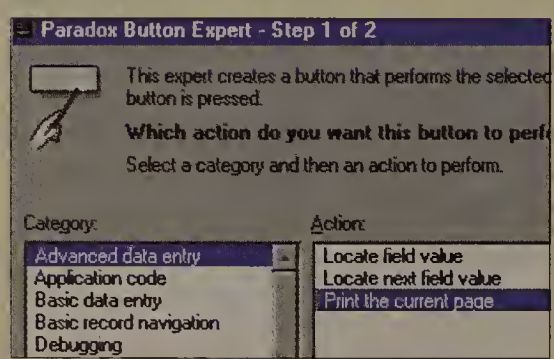
Most database users would love to be able to click a button to print the reports or open the forms they use most. Not too long ago you had to hire a programmer to set up a custom interface with personalized buttons. But now, all the Windows 95 databases reviewed here have tools that let any user create buttons that execute all kinds of commands. This is as close as you can get to programming without having to type in code.



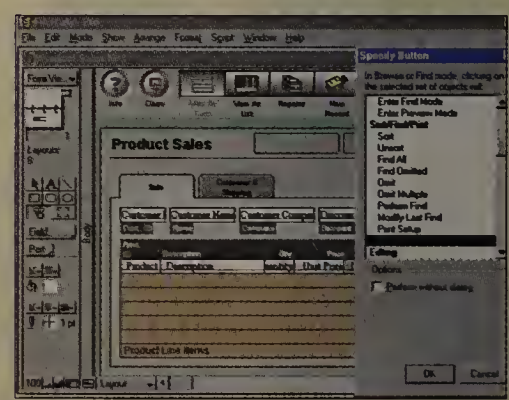
To add magic to an Approach button, define a macro by selecting commands from a pick list.



Access's Command Button Wizard asks what you want a button on a form to do.



Paradox opens its Button Expert when you place a button on a form; you tell it what the button should do.



When you place a button on a FileMaker Pro layout, a dialog box asks you to specify what action you want the button to perform.

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Access 7.0

PROS: Help really does; lots of timesaving Wizards

CONS: Confusing interface

NOTES FROM USERS

"The online Help is extensive and informative; it's all you need to learn the program."

"Filtering on a field is much too difficult. The Access developers should buy a copy of Approach."

Access clearly suffers an identity crisis. Even as its helpful Wizards hold your hand while you perform the most mundane task, such as building a table, it proceeds to confuse you with baffling terms in its menus and dialog boxes. The most striking example is the word *database*, which Access uses to mean an entire application, including tables, forms, and reports, while other programs use the term to refer only to tables. But our testers got through the confusion thanks to the extensive help system. Among its other assets, Access's help has lots of step-by-step instructions for accomplishing various tasks, and the natural-language Answer Wizard (standard in all Office applications) won plenty of praise.

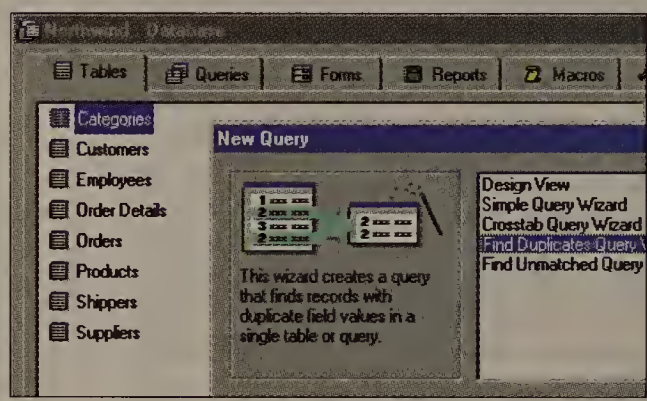
On the downside, the Wizards seemed to give our testers a false sense of confidence. Several testers pronounced some tasks "cool," "easy," and "straightforward," although they hadn't completed them. Some testers didn't even realize that they hadn't done what they were supposed to do. The Wizards' "Finish" buttons were just too reassuring.

Access offers several ways to achieve each task, and this extra functionality at times seemed more of a hindrance than an advantage. For example, our testers struggled with simple tasks like filtering data, in part because Access gives you several ways to perform them, depending on which mode you're using (View or Design). One tester pointed out a major difference between Access and Approach: In Access forms and queries, you have to use *expressions* (Excel-like formulas) to do things that Approach users can accomplish simply by pointing and clicking.

To get you up and running fast, Access offers lots of templates for the most common types of databases. These are great if you can use them as they are, but if you need to customize them, watch out. Leaving the cozy confines of the templates will be confusing to all but the savviest Access users.

Version 7.0 adds many impressive features to Access. It's currently the only database that uses the Windows 95 Briefcase for record-by-record data replication. This allows mobile users to update only the parts of their databases that have changed while they were on the road, rather than having to copy a huge table over from a notebook to the desktop system. As part of Office 95 Professional, Access is a model citizen. You can embed an Access table in a Word document, then make changes directly from within Word by double-clicking the table. You can also work with Excel spreadsheets from within Access and set up merges with Word.

The free Access Internet Assistant add-on converts tables and queries to HTML tables that users can post on their Web sites. You can download the Internet Assistant from Microsoft (http://www.microsoft.com/msaccess/internet/ia/default.htm).

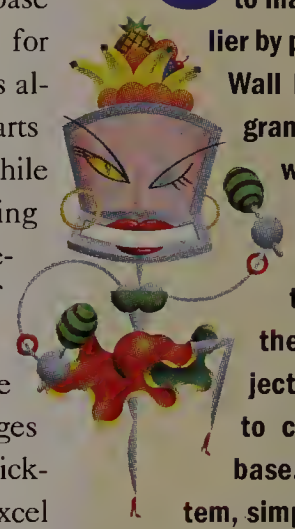


ACCESS 7.0 HAS MANY WIZARDS, including several for queries that help you find duplicate records and cross-tabulate data to see summary information.

In our performance testing, Access was generally a mediocre performer, and in one case—opening a form based on three joined tables—it came in last because it runs a query and gathers together all the records it needs to show before it opens the form's first page. However, once the form opens, there is virtually no delay in paging through subsequent records.

Bottom line: Access is a good choice for intermediate and power users, and for database developers. It's not the best choice for inexperienced people who want to whip up an application in a day or two. *Microsoft Corp.; 800/426-9400.* **Reader service no. 824**

Salsa Is Hot, Hot, Hot



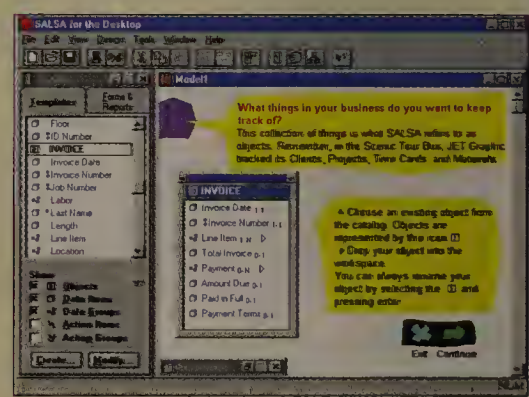
Can you say *paradigm shift?* While other companies struggle to make their packages friendlier by piling on the help utilities, Wall Data has invented a program that may change the way we think about database management. Salsa truly shields users from the technical terms and lets them work with familiar objects instead. You don't want to create a relational database. You need an invoice system, simple as that. So pick an Invoice object from Salsa's list of template models, describe in plain English the way you use them in your business (including rules for acceptable and unacceptable transactions)—and relax.

Behind the scenes, Salsa divides an invoice into separate tables for, say, orders and their associated line items. It then applies your rules to the data to prevent data entry errors. In essence, it creates the relational application for you. Salsa comes with a number of templates for business and personal use to help you get started.

Ironically, for all Salsa's simplicity, if you're a database power user or developer, it's likely to confuse you. No fields, queries, filters, nothing. Just plain old business terminology.

- **Salsa for the Desktop; list price $499, introductory price $149, starter kits $49 each; Wall Data Inc. Salsa Products; 800/777-2572.**

Reader service no. 828



The best way to get started is to select a template, then customize it.

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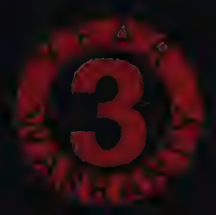

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*Tests conducted by the National Software Testing Laboratories, a division of McGraw-Hill, Cos. Published in *Business Week*, November 6, 1995. †For a complete copy of our Guarantees or Limited Warranties, please write Dell USA L.P., 2214 W. Braker Lane, Suite D, Austin, TX 78758. ◊Business leasing arranged by Leasing Group, Inc. ★Prices and specifications valid in the U.S. only and subject to change without notice. The Intel Inside logo and Pentium are registered trademarks of Intel Corporation. MS, Microsoft, Windows and the Windows logo are registered trademarks of Microsoft Corporation. ©1996 Dell Computer Corporation. All rights reserved.

How We Tested Usability

Over the past few years, database managers have migrated from development tools to the realm of the novice. Now—at least hypothetically—anybody can develop custom apps without a programming background.

To test whether this theory is true, we brought in a group of PC users with various levels of database experience. A few were beginners, some could be described as power users, and others had some programming experience. Each person was asked to test two or three databases with which they were unfamiliar, rate the difficulty of accomplishing tasks, and share their impressions afterward. The users were also asked to rate the on-screen help. All the ratings were then combined to calculate a total usability score for each product.

Three common findings emerged:

Helpers really help. Our testers deemed the help agents—Wizards, Experts, and Assistants—genuinely useful. Some, especially those with DOS database experience, resisted them at first. Novice users took to helpers enthusiastically.

Importing is a pain. Bringing data into a table was a headache for almost everyone. We asked the testers to import information from an Excel spreadsheet and append it to a data file. With Access and Paradox, this is a two-part procedure, a factor that was not immediately obvious. And FileMaker Pro can't import Excel files directly.

Modes are confusing. In these programs our testers had to toggle between data and design modes, an unintuitive concept. Approach lets you view data in design mode—but you can't edit it.

In the end, we found that database programs have come a long way in catering to the end user, but stumbling blocks still exist. New users will need time to solve these problems. For the scores our testers gave individual tasks, see the table below.

Usability Test Scores

	Access 7.0	Approach 96	FileMaker Pro 3.0	Paradox 7
On-screen help				
Quality of information	5.3	4	3.3	3.7
Overall efficiency	5.3	4	3.3	4.2
Data manipulation				
Import Excel spreadsheet, append data to table	4	4	1	1.7
Replace fields with values	2	4.4	4	2.7
Add image to record	4	2.7	4.3	3
Filter on a field	2.7	4.4	4	4
Filter and sort on a field	2.7	5.3	4.4	2
Delete records	5.3	4.7	4.3	2.7
Use a form for search and replace	2.7	5.3	3.7	2.3
Table manipulation				
Change field name	5.3	4	3.7	5.3
Add field to a table	5.3	4	4	4.3
Add drop-down menu to form	2.7	4.7	4.3	3.3
Create new form from a single table	4	4.4	4.9	4.3
Create new report from a single table	4.7	5	4.7	4.3
Create new report from two related tables	2	5.3	4.3	3.7
OVERALL USABILITY SCORE (6 maximum)	3.9	4.4	3.9	3.4

Approach 96 Edition for Windows 95

PROS: Easy-to-follow menus and dialog boxes, automatic indexing

CONS: Quality of help uneven, clunky import of 1-2-3 files

NOTES FROM USERS

"Approach calls things what they are. 'Create' means create. 'Browse' means look through some records."

"Adding a field in one view didn't guarantee its appearance in the other views."

Approach was designed as an end-user database from the get-go, and it shows. Our testers didn't think Approach's help system was as extensive as Access's, but then, they didn't really need a lot of help to use Approach. Approach still got the highest score for overall ease of use. This, combined with its speed and unique reporting features, earns it our Best Buy.

Several factors contribute to Approach's high usability scores (see Usability Test Scores). One important feature is the way it automatically indexes. In Access and Paradox, you need to index files yourself to get optimal performance on searches and sorts. Approach does this for you the first time you search or sort on a field.

Approach has lots of Assistants that help with tasks like designing forms, reports, form letters, and charts. The Assistants have good visual cues that help you pinpoint exactly what you are doing each step of the way. This is especially welcome when you're creating cross-tab reports and charts.

Two unique Approach features are PowerClick reporting and Drill Down To Data. The former lets you drag fields in report-

IN APPROACH'S DESIGN MODE, you can open the tabbed Inbox and use it to change the properties of whatever objects are selected.

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design mode to create groups, or drag them in a worksheet to formulate a cross-tab without running through the steps of the Crosstab Assistant. Drill Down To Data shows you the specific data underlying a slice of pie, a chart's bar, or a summary in a cross-tab. All you have to do is select the piece whose details you want to view and click the Drill Down To Data button.

As a full member of Lotus's SmartSuite, Approach has TeamMail for sending messages and attaching data files and views. Security features have been improved, and Notes users can now get to their data directly from Approach.

Surprisingly, Approach does not allow you to work directly with named ranges from its own suitemate, 1-2-3. You must first load the worksheet containing the named ranges that you want to use and then run 1-2-3 in the background.

Despite these shortcomings, Approach is by far your best bet here for making it all the way through a database application project without having to call in expert help. If you're a beginning or intermediate database user, put Approach at the top of your list.

Lotus Development Corp.; 800/343-5414, 415/335-2200. **Reader service no. 825**

FileMaker Pro 3.0

PROS: Lots of helpful templates; Windows 95 and Macintosh users can share data

CONS: No helpers for mail merge and layout design; somewhat limited relational capabilities

NOTES FROM USERS

"Can't import Excel spreadsheets? Are they kidding me?"

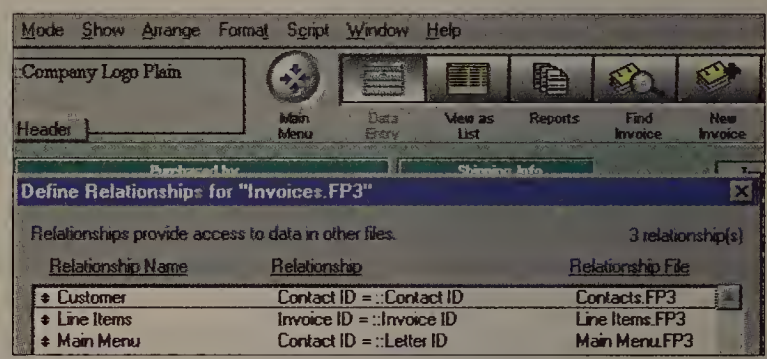
"Commands and functions use less-technical terms than in Access."

A few factors make FileMaker Pro quite different from the other products reviewed here. One is the lack of a programming language, so it's clearly meant for end users and is not as appealing to power users. Another is the way it handles text fields: In FileMaker, they have no set length, a flexibility that any user should appreciate. Third, FileMaker Pro 3.0 makes no distinction between forms and reports. You view, edit, and print data using the same "layouts."

But perhaps most important, FileMaker Pro is the only true cross-platform database management program in this roundup. Since its Windows and Mac versions are identical, it lets Windows and Macintosh users work with the same applications and access the same data.

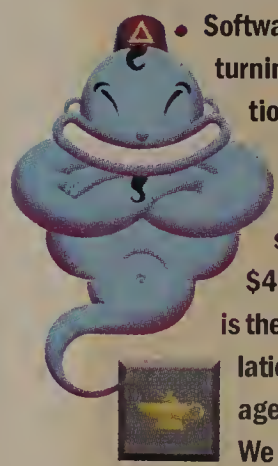
FileMaker Pro started out as a truly easy-to-use flat file (nonrelational database manager). With its clever pseudorelational scheme, it lets you handle some simple relational projects, but users needed more, and Claris listened. Now, with version 3.0, FileMaker Pro has gone fully relational.

FileMaker scored the best of all the products we tested in the table manipulation usability test, and came in second for data manipulation (see Usability Test Scores). Most of our testers judged the program very easy to navigate but found its help lacking, a factor that reduced its overall usability score.



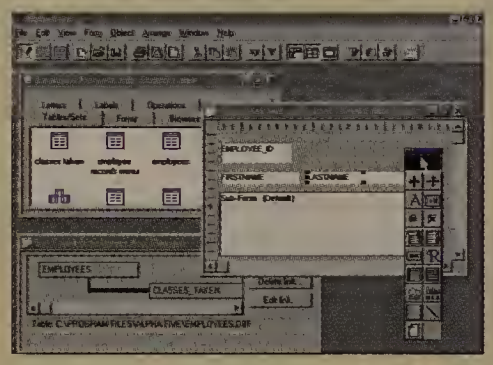
FILEMAKER PRO LETS YOU DEFINE RELATIONSHIPS between files so you can use the files together in the same layout.

Alpha Hits the Fifth Dimension



Amid the clash of the Microsoft, Borland, and Lotus titans, little Alpha Software has been quietly turning out capable relational database programs for a decade. Alpha Five 2.0 sells for as little as $40 on the street and is the most affordable relational database package for Windows 95. We were astonished by the features you get for the money. Alpha Five 2.0 comes with customizable toolbars, importing and exporting for different file formats, the ability to save query definitions and query results, a mail merge function with a built-in letter editor, plenty of application templates, and cross-tabs. It also comes with a host of help agents (*Genies*) for setting up forms, reports, command buttons, labels, and mail merges. However, Alpha Five lacks graphing and charting tools, direct client/server support, and a programming language, so the program doesn't make the big leagues.

But it has a very cool approach to data management. Unlike other products where commands for actions such as adding files together are scattered through menus and toolbars, each database object in Alpha has a Control Panel with a tab labeled Operations. When you click New Object in this tab, the New Object Genie presents a menu of useful functions, including Append, Copy, and Crosstab. Some of these Genies are not as useful as they could be, though. For example, the Crosstab Genie was cryptic, and we had to turn to on-screen help to figure it out.



Alpha Five makes the development environment appealing to power users and beginners alike.

Alpha has an extensive collection of built-in validation rules, which would take some programming in other products. For example, if you define a field as a credit card number, the program verifies that a Visa number fits the Visa account number format and reject the entry if it doesn't.

Alpha Five is reasonably easy to use, it can handle projects requiring a moderate level of relational database power, and its price can't be beat.

- Alpha Five, list price $49; Alpha Software; 800/451-1018
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Another important usability enhancement is automatic indexing. Like Approach, FileMaker creates an index the first time you search on a particular field. To speed things up, the index is then used for subsequent searches on the same fields. This transparent indexing is an important benefit for users who don't want to be concerned with such matters. One caveat, though: FileMaker took an extremely long time to create the indexes during the first search on a field (see the Test Report).

FileMaker is the only program in this roundup that doesn't save queries: Each time you want to display selected records, you have to recreate a query. It also has a confusing mail merge function and lacks charting and cross-tab tools.

Because of our usability results, and because there's no programming language, we feel that FileMaker Pro is best suited for beginning database users who don't need (or want) the complexity of the other products we looked at. It is also best suited for mixed-platform (Windows and Mac) workgroups. *Claris Corp.; 800/544-8554, 408/727-8227.* **Reader service no. 826**

FEATURES COMPARISON Windows 95 Databases

Ratings = poor, fair, good, very good, excellent, and n/a (not applicable)

Standard features	Access 7.0	Approach 96	FileMaker Pro 3.0	Paradox 7
List/upgrade price	$339/$129	$105/none	$199/none	$299/$99
Weekday phone support (hours)	12 [1]	12 [2]	12 [3]	11
Online, fax support	AOL, CIS, fax, WWW	CIS, fax, WWW	AOL, CIS, fax, WWW	BBS, CIS, fax, WWW
File Import/export capabilities	good	very good	good	good
Native data access	.dbf, .mdb, SQL, .xls	.db, .dbf	FileMaker Pro	.db, .dbf
Scripting	very good	excellent	very good	poor
Programming language	VBA	LotusScript	n/a	ObjectPAL
SQL support	via ODBC	DB2, Oracle, SQL Server	n/a	via IDAPI
Save queries	good	good	n/a	good
Customizable table view	good	very good	poor	very good
Mail merge	very good	fair	poor	very good
Data entry checking	good	very good	good	very good
Application templates	very good	very good	excellent	good
Field types	very good	good	good	excellent
Spelling checker	good	good	good	poor
Relational capabilities				
Graphical relationship map	good	good	poor	good
Drag and drop or point and click joins	good	good	good	good
Cascading updates for data changes	good	poor	poor	fair
Prohibit deletes	good	good	good	good
Forms, reports				
Style sheets	very good	good	fair	good
Text and object formatting	good	very good	very good	excellent
Data entry facilitators	excellent	very good	very good	very good
Cross-tabs	very good	excellent	n/a	good
Charts	very good	very good	n/a	very good
Help agents				
Database setup	excellent	good	good	good
Import	very good	fair	poor	good
Queries	good	very good	poor	poor
Report	very good	very good	poor	very good
Forms	very good	very good	poor	very good
Button	good	poor	poor	good
Charts	good	good	n/a	good
Cross-tabs	good	good	n/a	poor
Mail merge	very good	good	poor	good

[1] Two free calls, [2] 90 days toll-free, [3] 8 hours Friday.

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Paradox 7

PROS: Good help and lots of high-end features for developers and power users

CONS: Interface intimidating to new database users

NOTES FROM USERS

"Report generation was a breeze with the Report Expert."

"Why is there no sorting in forms? This is inexcusable!"

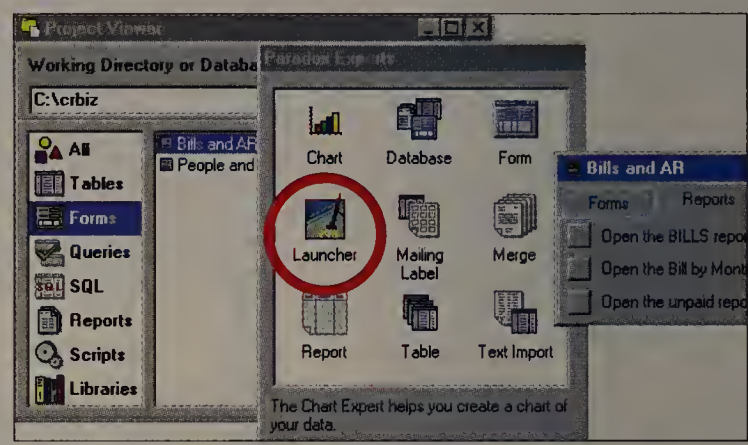
Paradox 7 has many more helpers, which it calls Experts, than its last version. Still, it was the least popular among our usability testers. Most expressed the opinion that Paradox is a powerful tool for database application developers rather than for end users, and we are inclined to agree with their conclusion. The most common reaction from our testers was, in a word, "confusing."

Despite its relatively low overall usability score, Paradox did well in the help category. Some testers commented that they preferred the Paradox Experts to the Access Wizards because the former were more intuitive and offered more options. And Paradox users can enlist the help of the new Experts in database creation. A Database Expert even generates entire applications, including tables, forms, and reports. If you don't need a complete relational application, or if you prefer to set up your own relationships after creating tables, there's a Table Expert with a good selection of business and personal templates. Other useful new helpers are the Chart Expert, the Mail Merge Expert (which works with Word and WordPerfect) and the Text Import Expert.

Our testers were quick to discover several gaping holes in Paradox. One is the inability to sort from within a form. But overall, the chief complaint concerned the unintuitive interface. In our performance testing, Paradox fared pretty well. It got the best score for opening a form with joined tables and was fastest at generating a report with selected records. When it came to searching on nonindexed values, Paradox's performance depended on the size of the file. It did better than the rest when searching on a file of 22,000 records but fell to second place when querying a file with 115,000 records.

Based on our usability results, we don't recommend Paradox 7 to novices. Unless you're already an expert in its programming language, ObjectPAL, it's hard to justify the time that learning the program will require. *Borland Int'l; 800/233-2444, 408/431-1000.*

Reader service no. 827



PARADOX 7'S NEW EXPERTS INCLUDE THE LAUNCHER. This helper creates a tabbed dialog box with buttons for opening database objects you choose.

TEST REPORT Databases in the Fast Lane

	Access 7.0	Approach 96	FileMaker Pro 3.0	Paradox 7
Initial query on nonindexed value—customer database (980 records)	0.8	1.1	0.7	0.8
repeat query	0.8	0.8	0.7	0.8
Initial query on nonindexed value—sales database (22,000 records)	2.6	7.4	109.8	1.7
repeat query	2.6	0.8	4.9	1.7
Initial query on nonindexed value—parts database (115,000 records)	7.9	53.2	468.4	12.2
repeat query	7.9	0.9	11.2	12.2
Query on indexed value—customer database	0.8	0.7	0.6	0.8
Query on indexed value—sales database	1.2	0.8	4.9	1.0
Query on indexed value—parts database	1.0	0.9	11.2	0.9
Open form	50.0	6.3	3.5	2.6
Query	1.0	0.9	0.6	2.2
Generate report using selected records	31.0	96.4	73.2	23.0
Initial sort items by price	24.7	24.4	223.3	51.5
repeat sort	24.7	1.6	223.3	51.5

Time in seconds

Methodology We tested each product on a Compaq Deskpro 5100 configured with a 100-MHz Pentium processor, 16MB of RAM, 256K of secondary cache, a 1083MB EIDE hard drive, and an integrated graphics controller with 1MB of VRAM. We installed Windows 95 using the default setup. We ran a query on a nonindexed value in each database file and recorded the time it took to regain cursor control. We repeated each nonindexed query because two of the programs autoindex the first time a query is run. We also ran a query on an indexed value in each database and recorded the time to regain cursor control. We opened a form that contained related records from each database file, then searched for a value. We generated a report that subtotaled one table based on the other two, and timed how long it took to display the first page of the report. We sorted items in the parts database by price. Tests designed and conducted by the PC World Test Center. All rights reserved.

☐ Single-file queries ☐ Relational operations (3 tables) ■ Reports ☐ Sort

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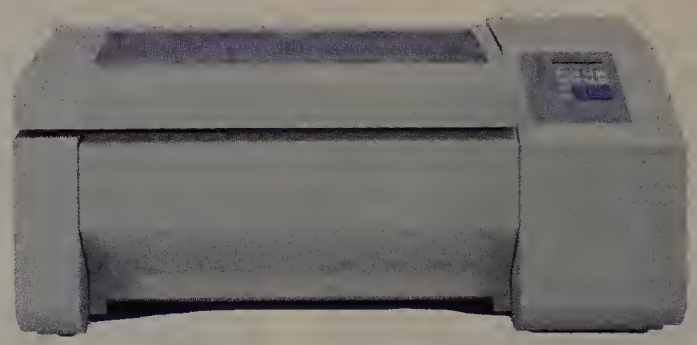
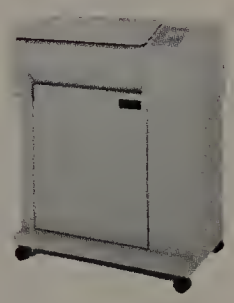


PC MAGAZINE EDITORS' CHOICE™
November 7, 1995
Mannesmann Tally T6045

The T6045 is an entry level line impact matrix printer that's short in cost-but not in performance. From general data processing to bar codes & other industrial graphics, the T6045 can print up to 450 lines per minute, and can handle a 80,000 pages a month with ease.



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intel inside pentium PROCESSOR

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WORKGROUP PRINTERS

All-Star Lasers

Need a heavy-hitting printer for your workgroup or department? Here's the winning lineup: PC World's Top 10 workgroup printers and Top 3 network printers. By Bill Underwood and Melissa Riofrio

Besides your PC, the piece of office equipment you rely on most is the printer, that unsung hero that sits in the back room faithfully churning out hundreds of pages day after day. Almost any monochrome laser printer you can buy today will do a nice job of printing common business documents. If you're tired of printing charts in crosshatch and gray scale, you can add a good color printer to your office for a few thousand dollars more. But among the many models available, there are discernible differences in print quality, speed, and ease of setup and use.

Introducing the Network Top 3

Every other month we list the 10 best printers for small offices in our *Top 10 Workgroup Printers* review. We look at the latest monochrome and color office models ranging in speed from 8 to 16 pages per minute, with features designed to serve the needs of about 6 to 15 users. This month we introduce a couple of important changes. First, we've updated our test suite to Windows 95 applications. Second, we've expanded our coverage to include higher-end printers for larger offices. Our new *Top 3 Network Printers* review ranks monochrome lasers rated at 17 to 25 ppm and designed to serve up to 30 people. They come with built-in network connections and have a much larger paper capacity.

Our test suite of word processing and spreadsheet documents, presentations, and graphics reflects what most businesses print today. To test the network printers, we added a batch printing test to simulate a large number of documents being sent to the printer concurrently

Apple LaserWriter 16/600 PS, HP LaserJet 5Si MX, HP DeskJet 1600CM Lexmark Optra Lx+.

over a network. Because of all the changes to the test suite and the review procedures, the ratings on previous Top 10 charts cannot be compared to the ratings on the new Top 10 chart.

We tested 21 printers in all, including 9 monochrome and 6 color workgroup models, and 6 monochrome network machines. Four Best Buys went to the printers with the best combination of print quality, speed, price, and design.

Tired of printing bar charts in gray scale? Add a good color printer to your office for $1999 and up.

Lexmark, HP, and Apple Take Best Buys

For the text and spreadsheets you print every day, Lexmark's $1950 Optra Lx+ is the top monochrome workgroup printer. Its print quality was superb, and if you buy its tray options, the Lx+ can handle more paper (1300 sheets) than any of its peers in this review.

The best color workgroup printer is Hewlett-Packard's $1999 DeskJet 1600CM. This ink jet beat out five color lasers for a number of reasons: It costs several thousand dollars less, you have to look closely to see that its text is slightly less crisp than a laser's, and its color quality was very good.

Larger offices will appreciate the greater speed and paper handling offered by our two network winners, Apple's $2065 LaserWriter 16/600 PS and HP's $4164 LaserJet 5Si MX. The Apple is one of the least expensive network contenders and had stellar print quality. The HP LaserJet 5Si MX offers greater paper handling and was much faster. However, it costs twice as much.

We tested but did not rank Digital's new Colorwriter LSR 2000 color laser. Its $13,000 price notwithstanding, it had a problem with Word 95, one of our test applications, that slowed its speed significantly and made it print ugly-looking text.

Three network printers weren't ready for review: Lexmark's 24-ppm Optra N should be out by the time you read this. Olympus Image Systems was unable to send us its 24-ppm laser, the PagePlex 24. We tried to test its sibling, the 18-ppm PagePlex 18, but its Windows 3.1 driver didn't work with our test suite. We'll try again when it has Windows 95 drivers. Look for these machines in the January issue's *Top 3 Network Printers* review.

Bill Underwood has tested printers for 16 years. Melissa Riofrio is an associate editor for PC World. *Testing performed by Dave Casini and Ulrike Diehlmann of the PC World Test Center. Support by Andrew Hawn and Julian Weatherby of the PC World Test Center.*

For more information about all products in this article, circle reader service no. 908.

TOP 10 WORKGROUP PRINTERS

		Last ranking	First reviewed	Type	Street price	Overall rating	Print quality: Monochrome	Print quality: Color	Speed: Monochrome	Speed: Color	Features, ease-of-use rating	Reader service number	Comments
MONOCHROME	1 Lexmark Optra Lx+ 800/891-0331	3	Mar 96	laser	$1950	91	92	–	86	–	94	642	Great print quality; control panel is very easy to use.
MONOCHROME	2 HP LaserJet 5M 800/752-0900	–	current	laser	$1799	90	88	–	91	–	86	643	Fastest speed; ethernet and LocalTalk standard.
MONOCHROME	3 Lexmark Optra R+ 800/891-0331	1	Mar 96	laser	$1450	89	92	–	84	–	87	644	Entry-level Optra has less RAM and input capacity than Lx+.
MONOCHROME	4 Okidata OL1200/PS 800/654-3282	–	current	LED	$1563	81	88	–	88	–	85	645	Good price for PostScript printer with 6MB of RAM.
MONOCHROME	5 TI microLaser PowerPro/12 800/848-3927	2	May 96	laser	$1439	80	88	–	90	–	74	646	Very fast, inexpensive; only 500-sheet capacity.
MONOCHROME	6 TI microLaser Pro/8 800/848-3927	–	May 96	laser	$1169	79	88	–	85	–	74	647	Least expensive; takes just 500 sheets, a bit slow.
MONOCHROME	7 HP LaserJet 4MV 800/752-0900	7	Jan 96	laser	$2916	78	85	–	86	–	89	648	Network ready, 16 ppm, prints full-bleed 11 x 17.
COLOR	1 HP DeskJet 1600CM 800/752-0900	1	Nov 95	ink jet	$1999	91	85	90	71	90	88	649	Very good print quality for low price; has ethernet.
COLOR	2 Tektronix Phaser 550 800/835-6100	–	May 96	laser	$5945	84	93	90	77	90	89	650	All-around fastest color laser with great print quality.
COLOR	3 Lexmark Optra C 800/891-0331	3	Mar 96	laser	$6400	84	91	90	73	90	90	651	Expensive, but has great print quality and good speed.

BEST BUY

Methodology Workgroup printers have rated engine speeds of 8 to 16 pages per minute. The overall rating includes ratings for print quality (27 percent), price (20 percent), features and ease of use (20 percent), speed (15 percent), service and support (13 percent), and consumables (5 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

For more information about all products in this table, circle reader service no. 905.

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What's more, the exclusive *Connections* CD-ROM offers you a wide selection of online products for both home and office.

To learn more about the Sportster Voice, or any of the other ways U.S. Robotics takes the limits off how fast you can get what you want, call us at 1-800-DIAL USR, or visit us at www.usr.com.

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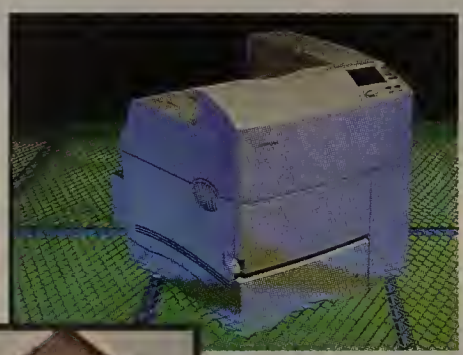
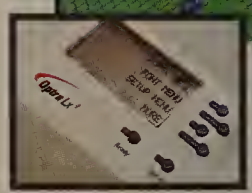
Monochrome Workgroup Printers

1 Lexmark Optra Lx+

PROS: Very easy to use, can handle more paper than competitors

CONS: Second most expensive printer on the chart, ties for highest estimated cost per page





Easier Labeling: The LCD panel on the Optra tells you the current function for the button next to it.

The Best Buy Optra Lx+'s superb print quality and ease of use overshadowed its high $1950 price and mediocre speed. Both of the 16-ppm Optra lasers we review (the Optra R+ is the other) share excellent manuals and intuitive front control panels rivaled only by the one in HP's second-ranking LaserJet 5M. An LCD panel changes the labels as you navigate the Optras' many functions—much easier than deciphering the cryptic, abbreviated labels on other printers' control panels.

Both Optras printed excellent gray-scale images as well as text and line art. The Optras can also print true 1200 dpi if you upgrade their standard RAM.

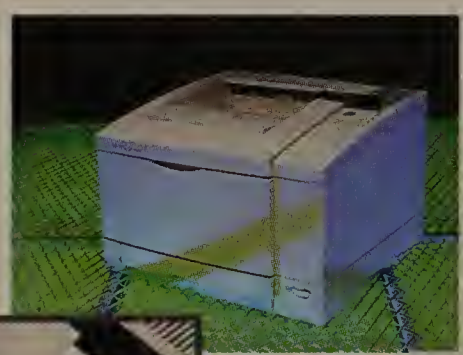
Under our Windows 3.1 test suite, the Lx+ was one of the fastest 16-ppm printers we'd reviewed, but with our new Windows 95 test suite, it was just middle of the pack. In particular, both Optras processed our gray-scale image slowly. It's possible that Lexmark hasn't worked all the kinks out of the Optras' new Windows 95 drivers.

The Optras' estimated cost per page, 2.8 cents, is the highest we've seen for a monochrome. That's our biggest reservation about a strong printer that well deserves its Best Buy.

2 HP LaserJet 5M

PROS: Fastest monochrome laser we've tested, revamped design is easier to use

CONS: Print quality and paper capacity aren't quite as good as that of the Lexmarks



Just Say Go: The new LaserJet 5M's control panel has buttons simply labeled "Stop" and "Go" to control printing traffic.

HP's $1799 LaserJet 5M is a less expensive, well-designed replacement for the 4M Plus. It's also the first printer to incorporate PCL 6, HP's latest version of its standard-setting page description language. According to the vendor, PCL 6 has been optimized for speed and print quality. Our tests seemed to bear this out: The 12-ppm LaserJet 5M turned in the fastest overall performance of any workgroup printer, particularly when printing graphics files like our full-page photograph. (The unit's 6MB of RAM probably helped.) The 5M's print quality was very good, too.

The LaserJet 5M's sleek design echoes the graceful, curved covers of the Optra printers. Its control panel takes after the traditional HP layout, but two new buttons simplify common tasks. The single Go button's prominent size and green color make it clear: This is what you press to continue printing after changing the toner or clearing a paper jam. There's a smaller Job Cancel button to immediately stop the job in progress.

What the LaserJet 5M lacks compared to the Optras is paper capacity: Its maximum is 750 sheets, compared to 1000 on the Optra R+ and 1300 on the Lx+. On the other hand, the 5M's $1799 price includes ethernet and LocalTalk network connections—more than the Optras offer. Network ready out of the box, with top-notch speed and print quality, the LaserJet 5M earns a solid second place on the chart.

3 Lexmark Optra R+

PROS: Excellent print quality, dynamic labeling on control panel is easy to understand

CONS: Slowest workgroup contender when printing gray-scale images

Our number three printer this month is the $1450 Optra R+. It's a less expensive but less expandable alternative to its Best Buy sibling, with just a 200-sheet paper cassette in its standard setup. Otherwise, the R+ is the same 16-ppm printer as the Lx+. Its performance was slightly slower than the Lx+'s, but the two machines' print quality was virtually indistinguishable—simply excellent on all counts.

4 Okidata OL1200/PS

PROS: Comes with PostScript and LocalTalk in its standard configuration

CONS: Front control panel is not as easy to use as those on the Optras and the HP LaserJet 5M

The Okidata OL1200/PS is an inexpensive 12-ppm LED (a technology similar to laser) printer that gets the job done. It just lacks the nifty control panels and better-designed drivers that make the Lexmark Optras and the HP LaserJet 5M much easier to use. At a low street price of $1563, it's a solid midrange performer too. The Okidata's text, gray-scale images, and line art are every bit as good as those of most printers we review this month, although the machine can't match the superb Lexmarks.

The Okidata comes with 6MB of RAM, which probably contributed to its speed. Other pluses in its configuration include a 500-sheet standard paper cassette and a maximum capacity of 1100 sheets. A LocalTalk network interface comes standard, but others, like ethernet, will cost you. If the slick features of the HP and Lexmark printers don't sway you, this is a well-priced option that's ready for Mac environments.

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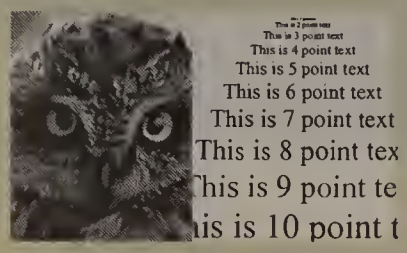
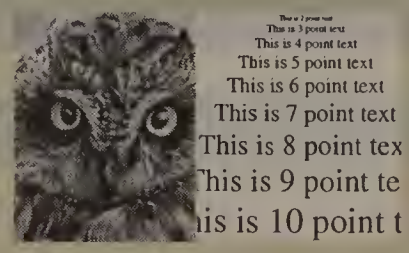
Lexmark Optra Lx+ The Optra Lx+'s print quality was superb in all areas. It produced smooth, realistic transitions between light and dark in our gray-scale image.

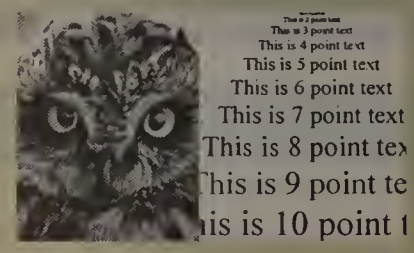


HP DeskJet 1600CM The 1600CM's text printing was nearly as crisp as a monochrome laser's. Its ink jet colors don't saturate like a color laser's, but they still look great.

Apple LaserWriter 16/600 PS The Apple's print quality was excellent across the board. Text here is legible down to 2-point size. The Apple handled tough line art smoothly, too.



HP LaserJet 5Si MX The 5Si MX printed some of the best gray-scale images among the network printers we tested; text and line art were also exemplary.



5 TI microLaser PowerPro/12

PROS: Very fast, good price, PostScript and LocalTalk standard

CONS: Holds only 500 sheets of paper, some banding in gray-scale images

The TI microLaser PowerPro/12 doesn't have the paper capacity of the higher-ranking printers on the monochrome workgroup chart, but for offices that don't print in high volume, it's a good—and, at $1439, economical—choice.

Rated at 12 ppm, the TI is fast. It performed nearly as well as the hotshot HP LaserJet 5M, thanks in part to Adobe Memory Booster, which uses the TI's standard 3MB of RAM very efficiently. Text quality was fine, but the unit's line art and gray scale couldn't quite match the Lexmarks'. In particular, we noticed some banding on gray-scale images.

The TI provides LocalTalk for Macintosh networks, but you'll have to pay $399 for ethernet. The only real smudge on this picture is paper capacity: The PowerPro/12's maximum is a mere 500 sheets, compared to the printers ranking above it, which can take 750 pages or more with additional trays.

6 TI microLaser Pro/8

PROS: Least expensive monochrome workgroup printer on the chart

CONS: Gray-scale images print darkly and show some unsightly banding

If saving a little money is a higher priority than a printer's speed, TI's $1169 microLaser Pro/8 is an inexpensive, midrange performer. It's nearly identical to its sibling, the microLaser PowerPro/12, except for its 8-ppm engine.

The microLaser Pro/8 could be a good cross-platform printer: It comes with PostScript Level 2 (and prints faster in that mode than in PCL), as well as LocalTalk for printing from Macintosh computers. An ethernet network interface costs an additional $399. Like the other TI microLaser printer we review, the Pro/8 printed good text and line art, but its gray-scale images were mediocre. Photographs we printed looked dark and showed some horizontal banding.

The microLaser Pro/8's low 500-sheet maximum paper capacity is its other drawback. For the price, however—the lowest on the chart—it can serve an office's basic printing needs as well as the Okidata or the TI above it can, albeit more slowly.

7 HP LaserJet 4MV

PROS: Comes with ethernet and LocalTalk, prints full-bleed on tabloid-size paper

CONS: Control panel is less user-friendly compared to newer designs

HP's LaserJet 4MV loses some points for its print quality and especially for its high $2916 price. But it offers some high-end features as well. It's one of the better-equipped models we've seen, as it includes both ethernet and LocalTalk network connections in its standard configuration. Its 750-sheet maximum paper capacity is better than that of the two TI printers that rank above it. And the 4MV is the only monochrome workgroup contender we've reviewed that can print full-bleed on 11-by-17-inch tabloid paper.

The LaserJet 4MV printed basic text documents ably. But it couldn't handle gray-scale images as well as higher-ranked contenders could. Our photographs looked dark printing from the 4MV. While the image didn't show banding, it didn't show a wide range from light to dark either.

Although the 4MV has been a steady chart contender for many months, the printer is showing its age. Despite the 4MV's 16-ppm engine, the new 12-ppm LaserJet 5M is faster. The 4MV's button-heavy front control panel is not as intuitive as its new sibling's, either. So what do you get for the price? A solidly built printer with decent speed and paper capacity that's also network ready, a distinctive trait for a workgroup contender.

The Vision

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Win '95 Plug n' Play BIOS

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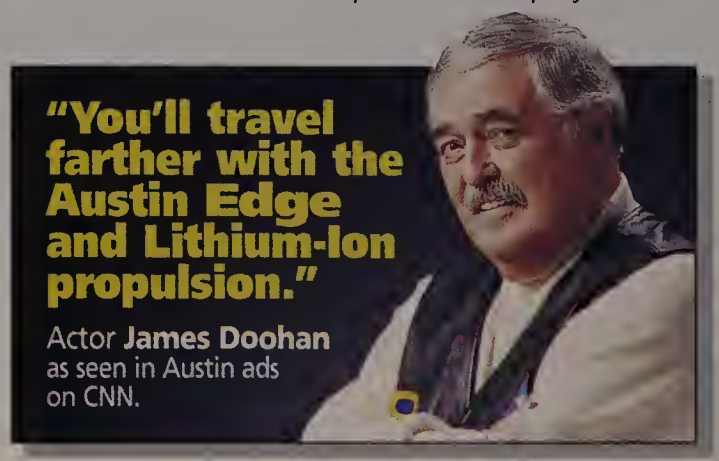

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133MHz Intel Pentium Processor

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56i	15" FST (13.6" VIS)	.28mm dot	1024x768 @ 80 Hz NI
56m†	15" FST (13.6" VIS)	.28mm dot	1024x768 @ 80 Hz NI

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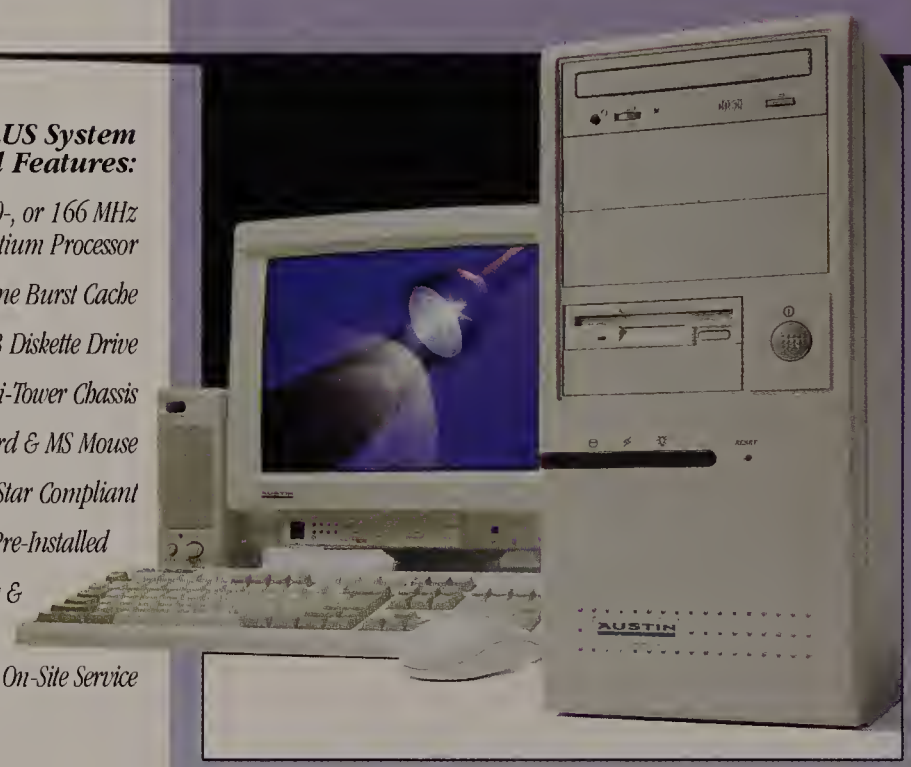

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3.5" 1.44MB Diskette Drive
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Affinity XE Pro: 4 EISA, 6 PCI Expansion Slots
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Color Workgroup Printers

1 HP DeskJet 1600CM

PROS: Inexpensive; good performance; great print quality for an ink jet

CONS: Unlike with lasers, prints from ink jets are sensitive to moisture and sunlight

The HP DeskJet 1600CM has occupied the top spot on the color workgroup chart since its debut last November for one simple reason: It's an economical, competent alternative to a color laser. The sole ink jet on the charts, it has a $1999 street price that's thousands of dollars less than even the cheapest color laser's, yet it still provides impressive print quality. Its cost per page is also significantly lower than a color laser's. And the DeskJet is a good performer: It earned midrange scores printing monochrome documents, but its speed in color was comparable to those of the two color lasers that rank beneath it.

Ink jet printers can be finicky about the kind of paper you use, and ink jet–printed pages are sensitive to moisture and sunlight. But even on plain paper, the DeskJet's colors are bright; line art is clean; and small text has minimal feathering at the edges. And unlike with most ink jets, you don't have to adjust the software settings to get the best results: The DeskJet's ColorSmart driver prints well using the default settings.

Okay, maybe you're a die-hard laser fan. On the other hand, it's hard to ignore the fact that you can print thousands of great-looking pages on the DeskJet 1600CM before spending as much as you'd pay for a typical color laser. The DeskJet 1600CM wins a Best Buy because it delivers high quality easily, quickly, and cheaply.

2 Tektronix Phaser 550

PROS: Best overall print quality, fast, lowest price for a color laser; unique HTML-based utility lets you check print status with a Web browser

CONS: You must buy Tektronix's expensive proprietary SIMMs for memory upgrades

The Tektronix Phaser 550 earns the number two spot on the color chart for its excellent print quality, its speedy performance, and its low price ($5945) for a laser. Tektronix achieves this in part by installing just 8MB of RAM in the standard model (previous versions of this printer had as much as 36MB). The Phaser 550 also lacks the ethernet and LocalTalk you'll find on most other color contenders reviewed here.

The Phaser 550 had the best print quality among the color lasers we tested, including legible text and sharp line art. Using its capable TekColor driver's default settings, you get effortless, great-looking color. If you like to tweak and fiddle, though, you can play with the driver's many buttons and controls. As with every other color laser, gray-scale quality was not as good as that of the better monochrome lasers.

The Phaser 550 is one of the faster color lasers we've seen. Overall, it was bested only by the HP Color LaserJet 5M, whose native 300-dpi resolution means the HP has an inherent speed advantage over the Phaser 550's native 600-dpi resolution, which requires that four times as many dots be printed.

For offices already equipped with Web browsers for the Internet or an intranet, the Phaser 550's PhaserLink software—the first of its kind—provides a platform-independent, HTML-based utility for viewing or changing print options. It also takes you directly to Tektronix's Web site for downloading the latest driver or getting tips and technical data. The Phaser 550 also can print on labels, something that all the other color lasers we've seen can't handle. A $1695 CopyStation hardware option turns it into a color copier, too—an attractive proposition. Unfortunately, to add RAM to the Phaser 550, you must use Tektronix's expensive proprietary memory. A 16MB SIMM from Tektronix costs $1195, compared to $30 to $50 per MB for off-the-shelf SIMMs. But in every other way, the Phaser 550 has hit a sweet spot for color lasers.

3 Lexmark Optra C

PROS: Excellent color quality, well-designed controls, universal paper tray

CONS: Its $6400 street price makes it the most expensive color laser on the chart

Landing third on the color chart is Lexmark's $6400 Optra C. Tektronix's Phaser 550 barely edged it out for second place.

The 600-dpi Optra C's print quality is nearly as good as the Phaser 550's. Text was legible down to 3 points—rivaling the quality of 600-dpi monochrome printers. Images such as photographs that require the smoothness of continuous-tone printing looked great using the default ColorGrade setting in Lexmark's driver. We improved on the default choices only slightly by using the better Contone setting and specifying High Quality color registration instead of Standard. This slows the printer down somewhat, but if you're looking for the very best color quality, it's worth the minor delay.

On individual timed tests, the Optra C was faster than the Tektronix printing Word documents in monochrome, but slower in Excel and Corel. It earned a lower overall speed rating in monochrome. On our color tests, it was the fastest overall.

The Optra C has the same control panel as the other Optras, and is very easy to understand without a manual nearby. Its universal paper tray holds 250 sheets of letter- or legal-size paper. What's more, it's an "intelligent" tray that can detect what size you've loaded and report it to the printer driver. This color laser is more expensive than the Tektronix Phaser 550, but in every other way it's a close rival.

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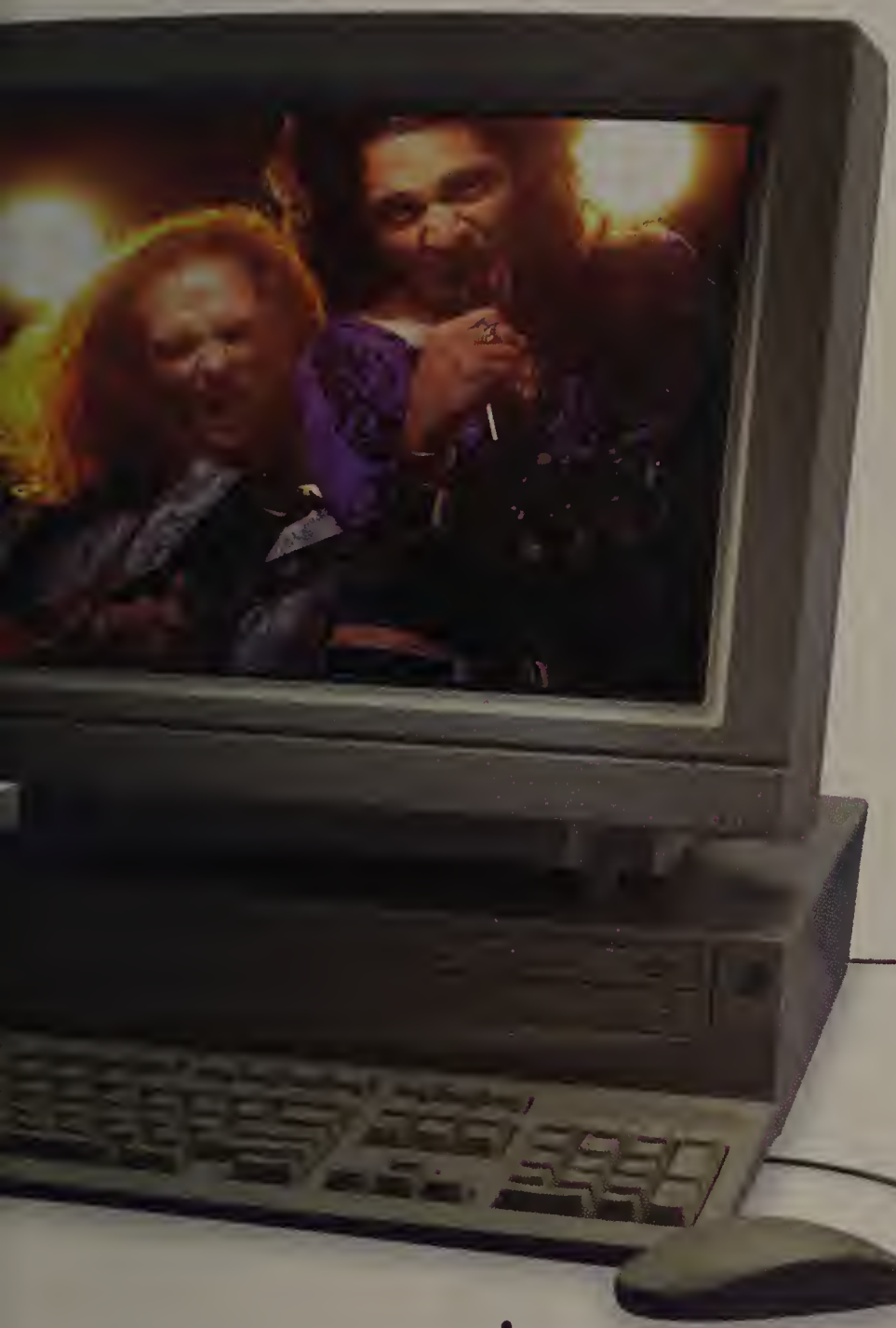

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TOP 3 NETWORK PRINTERS

		First reviewed	Type	Street price	Overall rating	Print quality rating	Speed rating	Batch print speed rating	Features, ease-of-use rating	Reader service number	Comments
MONOCHROME	1 Apple LaserWriter 16/600 PS 800/776-2333	current	laser	$2065	90	91	90	76	74	639	Best print quality; slow batch speed, holds only 750 sheets maximum.
	2 HP LaserJet 5Si MX 800/752-0900	current	laser	$4164	90	88	91	89	84	640	Very fast, handles many sizes and types of media.
	3 QMS 2425Ex 800/523-2696	current	laser	$5949	83	88	92	91	90	641	Fastest; most expensive; nearly identical to HP unit.

BEST BUY

Methodology Network printers have rated engine speeds of 17 to 25 pages per minute. The overall rating includes ratings for print quality (25 percent), performance (25 percent), price (15 percent), features and ease of use (15 percent), service and support (15 percent), and consumables (5 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

For more information about all products in this table, circle reader service no. 904.

Network Printers

1 Apple LaserWriter 16/600 PS

PROS: Excellent print quality, lowest-priced printer on the network chart

CONS: Upgrading RAM is inconvenient, slow batch printing, maximum input is only 750 sheets

Apple's $2065 LaserWriter 16/600 PS is inexpensive for a network printer, but its print quality is the best, and its overall performance is good for a 17-ppm laser.

This Apple has just a couple of worms. Its 750-sheet maximum paper capacity is skimpy; even some workgroup models can take 1000 or more sheets. Upgrading RAM requires tools for handling a number of screws. (Other units usually have two simple thumbscrews for removing the controller board.) With paper capacity and RAM upgrades our only major complaints, the Apple easily earns a Best Buy over more expensive models on the chart.

2 HP LaserJet 5Si MX

PROS: Very good print quality, fast performance, flexible paper handling

CONS: Expensive compared to the Apple LaserWriter 16/600 PS

One of the two 24-ppm models we tested, the HP LaserJet 5Si MX also wins a Best Buy spot. It's the second-fastest printer on the network chart—a nose slower than the QMS 2425Ex, which uses the same engine—and it has sharp print quality, especially in gray scale. At $4164, the HP costs over twice as much as the Apple Best Buy. But the HP is the better choice for offices that print a high volume of documents on a wide variety of papers.

The LaserJet 5Si MX takes up a lot of room, but it can do more than most printers. Out of the box, the 5Si MX can handle papers ranging from 16-pound bond to 110-pound index card stock, as well as tabloid paper and envelopes. Its maximum paper capacity with optional input trays is a whopping 3000 pages. You can buy additional hardware for printing in duplex on 11-by-17-inch sheets—a first in desktop lasers—and a high-capacity output stacker that can also provide individual mailboxes for printouts. Ready to print almost anything in any amount you want—and fast, too—the HP LaserJet 5Si MX is the Best Buy for big, busy offices.

3 QMS 2425Ex

PROS: Very good print quality, fastest network printer, comes with 256MB hard drive

CONS: Essentially the same printer as the HP 5Si MX, but much more expensive

The QMS 2425Ex's print quality and configuration, which includes 24MB of RAM and a 256MB hard drive, are hard to beat. But you'll pay for these goodies: Its $5949 price is almost $1800 more than the HP LaserJet 5Si MX's.

Like the HP, the QMS has a control panel that protrudes from the front of the machine. This control panel is easier to use than the HP's, however—there are more one-step buttons on the QMS, and they're easier to understand. QMS also offers a scanner/copier device that attaches to the printer's SCSI port. Something else your network administrator will like: The resident flash ROM lets you easily update the unit's firmware—no need to remove the controller board and replace old ROM when updated firmware becomes available. For some offices that need the printing power that the QMS 2425Ex offers, these distinctive features could offset its high price.

There are other ways to accelerate your multimedia, but may we suggest our new Graphics Blaster.

Multimedia can be a frustrating thing. Even on today's hottest systems, video playback can end up looking like a postage stamp with fewer colors than you get from a box of crayons. Or, when you zoom it to full screen, it looks like a slide show instead of a smoothly running movie. Before you resort to extremes, you might want to try our new Graphics Blaster™ multimedia accelerator from Creative Labs.

Graphics Blaster features high-tech video acceleration functions like asymptotic scaling, horizontal and vertical filtering and color space conversion built right into the hardware. The end result is video that glides onto the screen in dazzling true color without dropping frames. And the powerful 64-bit graphics engine delivers Windows® performance that will blow you away.

Best of all, Graphics Blaster won't blow away your bank account. Our top-of-the-line Graphics Blaster MA302 with 2MB of state-of-the-art Rambus memory — the same high performance memory used on Silicon Graphics workstations — costs less than comparable boards using yesterday's tired VRAM memory.

So when you're ready to boost your graphics and video performance to the stratosphere, pick up a Graphics Blaster at your nearest Creative Labs dealer. It's got the multimedia muscle your system deserves. What else would you expect from Creative Labs, the leader in high-performance multimedia products.

Introducing Graphics Blaster Multimedia Accelerators

	64-bit Graphics Engine	16.7 Million Colors	Maximum Resolution	Refresh Rate	Plug and Play Monitor	Full-Screen Video Playback
Typical Graphics Accelerator	64 bit		1280 1024	120Hz		
Graphics Blaster MA302 Multimedia Accelerator	64 bit		1600 1200	150Hz		

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Circle 59 on reader service card

Printer Snapshots

These printers were also tested and reviewed but didn't score high enough to reach the charts.

Apple Color LaserWriter 12/600 PS

PROS: Excellent color printing; ethernet, LocalTalk, SCSI standard

CONS: Slowest color laser

Under our old Windows 3.1 test suite, the $6499 Color LaserWriter 12/600 PS ranked second on our color workgroup chart. The Apple's painfully slow print times with our new Windows 95 tests, however, have dragged it off the chart.

To the Apple's credit, print quality is great. In photographic images, it caught small details, such as labels on a dashboard, that were printed less distinctly by other color lasers. *Apple Computer, Inc., 800/776-2333.* **Reader service no. 816**

Brother HL-960

PROS: Least expensive monochrome workgroup contender

CONS: Slow, needs an external networking device, no PostScript

The $999, 12-ppm HL-960 fulfills basic monochrome printing needs—nothing more. It's one of the slower monochrome workgroup printers we tested, its print quality was unimpressive, and it's not networkable unless you buy a third-party device. *Brother International, 800/276-7746.* **Reader service no. 817**

HP Color LaserJet 5M

PROS: Fastest color laser's matte-finish toner is easy on the eyes

CONS: Expensive, not good for sophisticated graphics

At $7395, the Color LaserJet 5M is the most expensive color workgroup laser we reviewed. Granted, it's the fastest color laser we've tested and comes with ethernet and LocalTalk, as well as 24MB of RAM, but for that much money we'd also want better print quality on continuous-tone images like photographs. The Color LaserJet 5M can print simple color images like bar charts competently. But when we tried more complex images, it didn't achieve the sharper detail of other color lasers we've seen. *Hewlett-Packard, 800/752-0900.* **Reader service no. 818**

Kyocera FS-1600+, FS-3600+

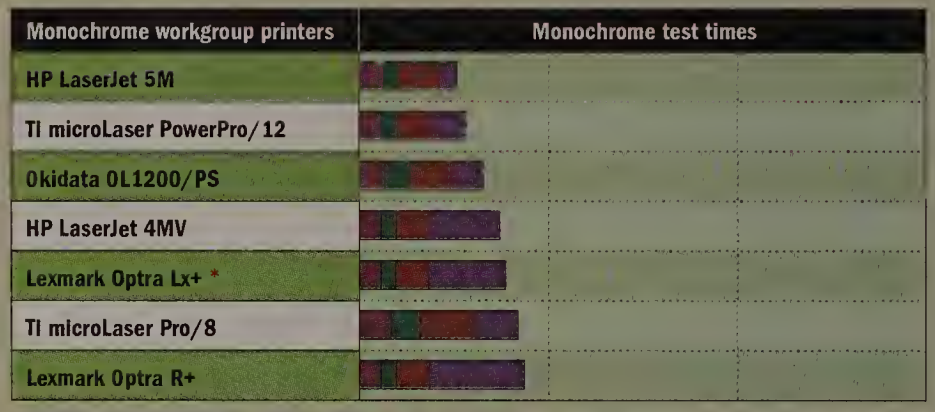
PROS: Very low cost per page, a plethora of paper tray options

CONS: Measly 2MB of RAM standard, mediocre print quality

The $1483 FS-1600+, a workgroup contender, has a 10-ppm engine, and the $3113 FS-3600+, a network contender, has an 18-ppm engine. Neither monochrome unit made the charts: Their standard configurations are bare-bones, and they both had mediocre print quality.

The Kyoceras come with just 2MB of

TEST REPORT HP, Tektronix, QMS Turn In Fastest Times



Printers are arranged within each category in order of total time to complete each category's tests, from best to worst.

Methodology We test all printers in default mode under Windows 95 using the parallel port on a Micron P90 Millennia with 16MB of RAM. We turn off power saving at the printer to prevent warm-up time from affecting the scores. We measure the time from issuing the print command until the last sheet lands in the output tray. For the batch printing test, we pause the printer, spool all the documents to it, take it off pause, and then start the clock.

Monochrome Printing Tests

Excel 7.0 We print a five-page worksheet.

Word 7.0 newsletter We print a two-page document.

Word 7.0 text We print a ten-page document. We record the print time in normal mode.

CorelDraw 6.0 We print a color photograph in gray scale.

Color Printing Tests

Excel 7.0 We print a two-page table with a pie chart.

Harvard Graphics 4.0 We print a five-page presentation, with each page heavily saturated with color.

CorelDraw 6.0 We print a color photograph.

Batch Printing Test (Network Printers Only)

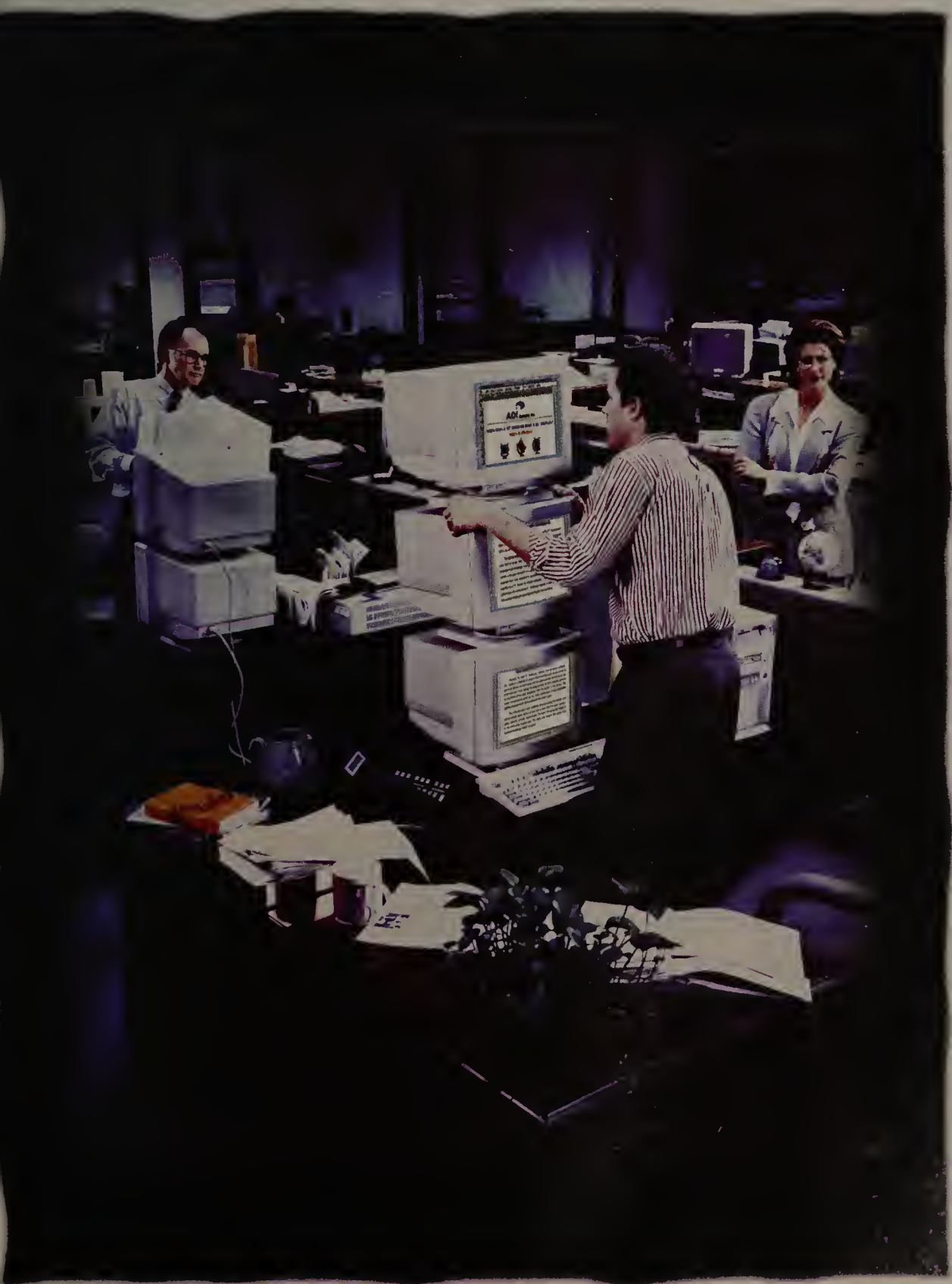
The batch includes all the monochrome and color test files, plus an Adobe Illustrator 4.1 PostScript color file, printed in monochrome.

*** Best Buy**

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

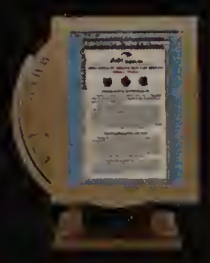
ONE OF THE MANY REASONS MORE AND MORE PEOPLE NEED PIVOT MONITORS.

They're describing their ordinary monitors as "vertically challenged."



Don't blame your monitor for being short and wide. It's the way most of them are built. Most, except for the MicroScan™ 17X. With a simple swivel, the MicroScan 17X provides more vertical viewing area than any other 17" and even 21" monitors. Just imagine how much easier that would make working with Windows,® web pages, or any kind of applications. Once you see the MicroScan 17X pivot monitor in action, you may never turn back. To find out, call:

1-800-228-0530.



The MicroScan 17X features a 17" CRT (16" diagonal viewing area), 1024 x 768 resolution, 76Hz flicker-free refresh rate and .28mm dot pitch.

ADI

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RAM and a 250-sheet input tray. This is barely enough to function in an office, and in the case of the FS-3600+, we had to upgrade memory to 10MB before the printer could finish our speed tests.

The Kyoceras offer numerous paper tray options, and their cost per page is very low. But the other flaws overshadowed these attributes. *Kyocera Electronics Inc., 800/232-8797.* **Reader service no. 819**

Xerox 4520mp

PROS: Prints on tabloid-size paper, holds up to 2250 sheets

CONS: Lackluster performance, protruding paper trays are clumsy

A network contender, the $3643 Xerox 4520mp's high (2250-sheet) paper capacity and its ability to print on tabloid-size paper make it a near equal to the HP and QMS printers that made the chart. But these attributes couldn't compensate for the slow performance of its 20-ppm en-

FEATURES COMPARISON Printers for Offices Big and Small

● = Yes ○ = No

n/a = not applicable

	HP LaserJet 4MV	HP LaserJet 5M	Lexmark Optra Lx+	Lexmark Optra R+	Okidata OL1200/PS
Standard features	MONOCHROME WORKGROUP PRINTERS				
Printer type	laser	laser	laser	laser	LED
Street price as of 4/4/96	$2916	$1799	$1950	$1450	$1563
Maximum black resolution as configured (dpi)	600 x 600	600 x 600	600 x 600 [1]	600 x 600 [1]	600 x 600
Maximum color resolution as configured (dpi)	n/a	n/a	n/a	n/a	n/a
Installed/maximum RAM (MB)	12/44	6/52	4/64	2/48	6/34
Rated engine speed (ppm), monochrome/color	16	12	16	16	12
Monthly duty cycle (pages)	50,000	35,000	75,000	35,000	24,000
Standard connectivity	parallel, ethernet, LocalTalk	parallel, ethernet, LocalTalk	parallel, serial	parallel, serial	parallel, serial, LocalTalk
Standard page description languages	PS Level 2, PCL 5e	PS Level 2, PCL 6	PS Level 2, PCL 5e	PS Level 2, PCL 5e	PS Level 2, PCL 5e
Cost of consumables [2]					
List price of black ink or toner cartridge	$199	$160	$199	$199	$65
Cartridge life (pages)	8100	6800	7000	7000	5000
List price/page life of drum or printhead [3]	n/a	n/a	n/a	n/a	$335/30,000
List price of color ink or toner cartridge	n/a	n/a	n/a	n/a	n/a
Cartridge life (pages)	n/a	n/a	n/a	n/a	n/a
Cost for standard monochrome text page [4]	2.5¢	2.3¢	2.8¢	2.8¢	2.4¢
Cost for standard color page [4]	n/a	n/a	n/a	n/a	n/a
Design					
Specified width x depth x height (inches)	18.1 x 20.6 x 12.5	17.4 x 16 x 11.8	16.1 x 21.1 x 17.2	16.1 x 21.1 x 13.1	14.4 x 16.9 x 10.6
Specified weight (pounds)	51	37	46	40	35
Printing power consumption (watts)	385	300	320	320	600
Paper handling					
Standard/maximum capacity (pages)	250/750	250/750	500/1300	200/1000	500/1100
Output tray capacity (pages)	250	250	500	250	250
Maximum paper size	tabloid	legal	legal	legal	legal
Standard/maximum envelope capacity	10/10	10/75	1/75	1/75	10/50
Service and support					
Warranty (years)	1	1	1	1	1
Toll-free tech support	○	○	●	●	●
Weekday tech support (hours)	16	16	10	10	10
Weekend tech support/on-site service	●/●	●/●	○/●	○/●	○/○
Repair turnaround policy (days)	1	1	1	1	3
Fax-back service	●	●	●	●	●
Online support sites	AOL, BBS, CIS, WWW	AOL, BBS, CIS, WWW	BBS, CIS, WWW	BBS, CIS, WWW	BBS, WWW

BEST BUY

[1] 1200 x 1200 dpi with RAM upgrade.

[2] Based on vendor estimates.

[3] For printers with a long-life drum and replaceable toner.

gine. It barely kept up with some of its 17-ppm rivals in the network category. *Xerox, 800/349-3769.* **Reader service no. 820**

Xerox DocuPrint 4517

PROS: Good print quality

CONS: Slow, measly 2MB of RAM isn't enough for complex images

A network printer, the Xerox DocuPrint 4517 includes a very small amount of RAM (2MB) in its standard configuration. This probably helped keep its initial price a low $1850, but it also hampered the printer's speed. The DocuPrint 4517 printed our test suite slowly, and we had to add 8MB of RAM to the machine for it to be able to handle more complex graphics. A variation on this printer, the DocuPrint 4517mp, comes with 6MB of RAM, ethernet, and PostScript Level 2 for $2550. *Xerox, 800/349-3769.* **Reader service no. 821**

	TI microLaser PowerPro/12	TI microLaser Pro/8	HP DeskJet 1600CM	Lexmark Optra C	Tektronix Phaser 550	Apple LaserWriter 16/600 PS	HP LaserJet 5Si MX	QMS 2425Ex
			COLOR WORKGROUP PRINTERS			MONOCHROME NETWORK PRINTERS		
	laser	laser	ink jet	laser	laser	laser	laser	laser
	$1439	$1169	$1999	$6400	$5945	$2065	$4164	$5949
	600 x 600	600 x 600	600 x 600	600 x 600	600 x 600 [1]	600 x 600	600 x 600	600 x 600
	n/a	n/a	300 x 300	600 x 600	600 x 600	n/a	n/a	n/a
	3/19	3/19	6/70	8/64	8/72	8/32	12/76	24/128
	12	8	9/4	12/3	14/5	17	24	24
	10,000	10,000	12,000	15,000	20,000	50,000	100,000	100,000
	parallel, LocalTalk	parallel, LocalTalk	parallel, ethernet, LocalTalk	parallel, serial, LocalTalk	parallel, SCSI	parallel, ethernet, LocalTalk, SCSI	parallel, ethernet, LocalTalk	parallel, ethernet, SCSI
	PS Level 2, PCL 5e	PS Level 2, PCL 5e	PS Level 2, PCL 5e	PS Level 2, PCL 5e	PS Level 2, PCL 5	PS Level 2, PCL 5	PS Level 2, PCL 5e	PS Level 2, PCL 5e
	$199	$199	$32.95	$119	$199	$97.98	$260.50	$259
	15,000	15,000	1600	4000	10,000	6000	15,000	15,000
	$199/30,000	$199/30,000	n/a	$179/15,000	$755/60,000	n/a	n/a	n/a
	n/a	n/a	$34.95	$139	$269	n/a	n/a	n/a
	n/a	n/a	1600	4000	8000	n/a	n/a	n/a
	2.5¢	2.5¢	2¢	4.2¢	3.2¢	1.6¢	1.7¢	1.7¢
	n/a	n/a	9.9¢	21¢	20.7¢	n/a	n/a	n/a
	13 x 14.4 x 12.8	13 x 14.4 x 12.8	20 x 17 x 11	21.3 x 22.8 x 18	27.4 x 19.5 x 18	16.8 x 16.9 x 12.1	21.3 x 20.5 x 21.3	22.3 x 21.9 x 21.3
	32	32	25	110	117	40	99	106
	650	650	66	450	210	390	515	580
	500/500	500/500	180/680	250/500	250/750	250/750	1000/3000	1000/3000
	250	250	100	100	250	250	600	600
	legal	legal	legal	legal	legal	legal	tabloid	tabloid
	1/30	1/30	1/20	n/a	n/a	10/10	100/100	1/100
	1	1	1	1	1	1	1	1
	●	●	○	●	●	●	○	●
	8	8	16	10	11	12	16	12
	○/●	○/●	●/○	○/●	○/●	○/●	●/●	○/●
	3	3	1	1	1	○	1	10
	●	●	●	●	●	●	●	●
	BBS	BBS	AOL, BBS, CIS, WWW	BBS, CIS, WWW	AOL, BBS, CIS, WWW	BBS	AOL, BBS, CIS, WWW	BBS, WWW

[4] Letter-size documents at 5 percent page coverage for black or 7.5 percent coverage per color.

APRIL GREIMAN

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on PageMaker 6.0.

While other designers were hunched over their drafting boards, April Greiman was among the first to realize the potential of electronic technology using Adobe™ PageMaker™. Today she is a recognized leader in graphic, environmental, motion and interactive format design. She has earned lasting recognition for trend setting graphics, interactive television interface designs, textiles, even industrial surfaces. Her graphic software then and now: Adobe PageMaker. Today's new Adobe PageMaker 6.0 is more powerful and advanced than ever. It's integrated with Kodak's Precision Color Management System for incredible color control. For more complex jobs, multiple master pages speed the creation of different pages in a single publication. Other new features include grouping and ungrouping to move and edit multiple elements as a whole and integrated automatic trapping for color publications. And to help April create and publish great work anywhere, even across the Web, she can output her files in HTML and the Adobe Acrobat™ Portable Document Format (PDF). Finally, Adobe PageMaker 6.0 is so easy to use, you don't have to be a leader in digital design to use it. But Adobe PageMaker could help you look like one. Call 1-800-422-3623, Ext. E1672 for more information or visit our Web site at http://www.adobe.com/.

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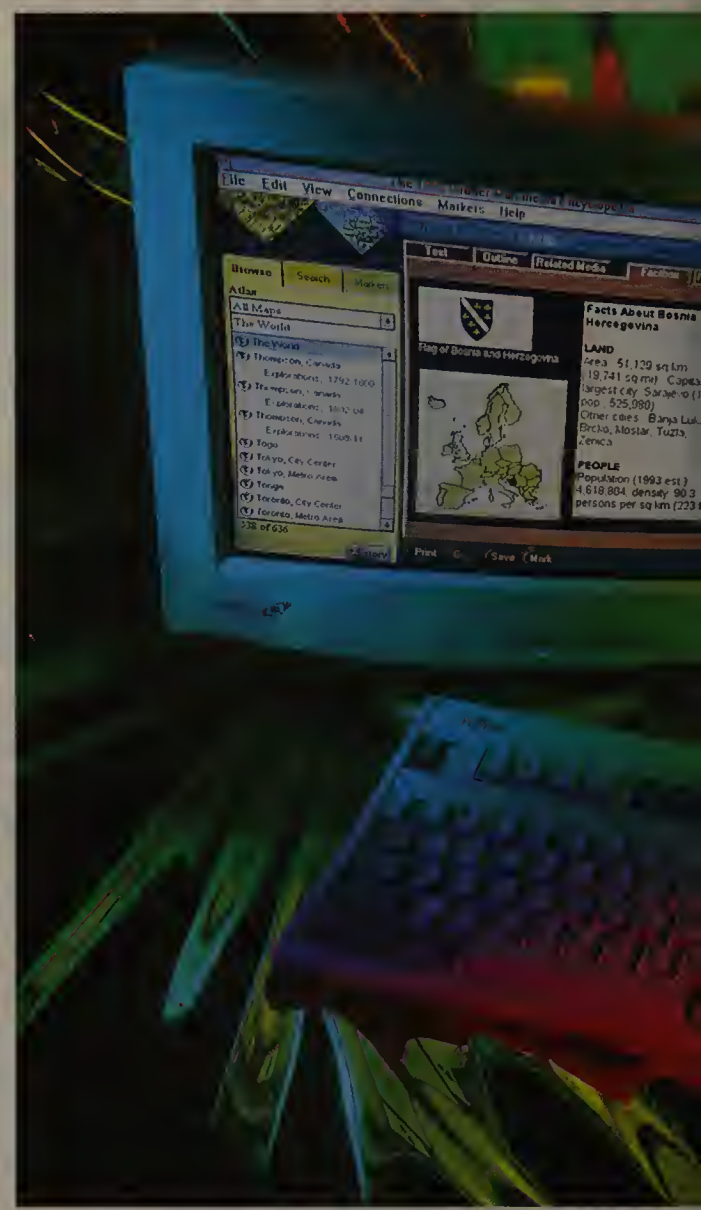
Circle 12 on reader service card

New desktop PCs with Cyrix processors have the speed to challenge top-ranked Pentium



If it weren't for good old-fashioned competition, we'd probably all be using Macs. After all, Apple put the "ease" in ease of use long before Microsoft started touting Plug and Play. But heated competition in the IBM-compatible–PC market keeps prices down and accelerates innovation, resulting in a vast selection of PC products.

THE TOP 20 PC WORLD
Power pg. 176
Budget pg. 184
Notebooks pg. 192

LEFT: The Micro Express MicroFlex-686/P120+ is fast and affordable.

CENTER: Sys Technology pushes its Performance C166+ to the speed limit.

RIGHT: Cyrix's own 6x86-P166+ PC is loaded with powerful extras.

Pentiums

performers from Dell and Micron.

MICHAL VENERA

The latest battle is for the very heart of your PC—its CPU. After failed attempts by several companies to break Intel's stranglehold on the CPU market, Cyrix seems to have a winning formula. The Cyrix 6x86 family of CPUs is as fast as Intel's Pentium line, or faster. In fact, the individual chips are named for their Pentium-like performance, not for their clock speeds. For example, the 6x86-P166+ PC runs at 133 MHz but performs like a fast 166-MHz Pentium. The chips are also cost competitive. When they first came out, Cyrix chips cost roughly 20 percent less than Pentiums. This differential allowed early adopters to give buyers more for their money in the way of other features. As we went to press, Intel announced large price cuts across its

By Brad Grimes

Meet Their Match

Pentium series to bring its CPUs in line with Cyrix 6x86 chips. So look for even better deals on PCs in the coming months.

So far, only two third-party vendors—Micro Express and Sys Technology—have adopted 6x86 chips. This month the $1899 Micro Express MicroFlex-686/P120+ and the $2599 Sys Technology Performance C166+ earn spots on our Budget and Power charts, respectively. The MicroFlex is faster than any P-120 we've tested, while the Sys Performance equals the speed of the fastest P-166 we've tested.

But Cyrix is so confident of its new CPUs, it has started its own line of systems. This month we tested the $4639 Cyrix 6x86-P166+ PC, which landed at number 15 on the Power Desktops Top 20. It's actually more expensive than most P-166s we've tested, but that's because Cyrix loaded this model with a 4GB SCSI hard drive and an Adaptec SCSI controller. The standard configuration, which has a 2GB IDE drive, is more than $1300 cheaper.

A Desktop PC for Your Briefcase

We have a new number one power notebook. The $5599 Gateway 2000 Solo S5-120XL is the second-fastest portable we've ever tested, due in part to its 40MB of RAM. Gateway markets this as its "Best Buy" model. It comes with enough memory to choke one of the cows in the company's ads, a 1.3GB hard drive, a 4X CD-ROM drive, and a 28.8-kbps PC Card modem. If that's not enough, it lasted over 5.5 hours in our battery test.

Another newcomer to the power notebook charts this month is the $3299 AST Ascentia J30. This P-100 system is lightweight and runs for over 5 hours.

On our budget notebooks chart, Toshiba claims both Best Buys now that Dell has discontinued its highly successful Latitude LX line. The top-ranked $1999 Satellite 100CS is a great value if you want a Pentium portable, while the number two $1599 Satellite T2130CS is even cheaper—an excellent deal if you don't mind its slower DX4-75 processor.

You'll notice some significant changes in our reliability and service scores for notebook vendors. We refreshed our data with a new reader fax-back survey and modified the way we calculate a company's service rating. According to the responses we've received, Toshiba continues to sell the most reliable notebooks, and now it also provides the best service. Readers are less satisfied with IBM's system reliability than in the past but appreciate the service the company provides.

Dell remains firmly entrenched atop our Power and Budget Desktops charts. Soon Dell will replace its "c" series with an "s" line that features a new case design, chip set, and memory architecture. For now, the Dimension XPS P133c remains the best value in a power desktop. Meanwhile, the new $1879 Dimension P100t debuts at number one on the Budget chart.

Hewlett-Packard grabs a Best Buy on our Power chart with its new Vectra 500 Model 515MCx 5/166. The Vectra 500 comes with lots of good software and a modem that supports voice mail, making it a perfect fit for small businesses.

Perhaps the most notable system *not* to make the chart is the $5699 Xi Pro 200 MTower SP. It's the first desktop PC we've reviewed that uses a Pentium Pro-200 processor with Windows 95. The Xi model is the fastest PC we've tested, and it's loaded with memory and storage. Next month we'll look at Pentium Pro-200s from Dell and Quantex.

Brad Grimes is an associate editor for PC World. *He can be reached on PC World Online (see page 14 for contact information). Freelance writers Jon L. Jacobi and Owen Linderholm contributed to this article. Testing by Ulrike Diehlmann; research and support by Ann Cassidy, Andrew Hawn, and Julian Weatherby.*

For more information about all products in this article, circle reader service no. 910.

Coming Soon to a PC Near You

Pentium-200 processors. By the time you read this, systems based on Intel's latest Pentium chip will be available from several PC vendors. But don't jump on the bandwagon just yet: Our first look at P-200 PCs indicates they're not much faster than current P-166 systems (see *Top of the News*).

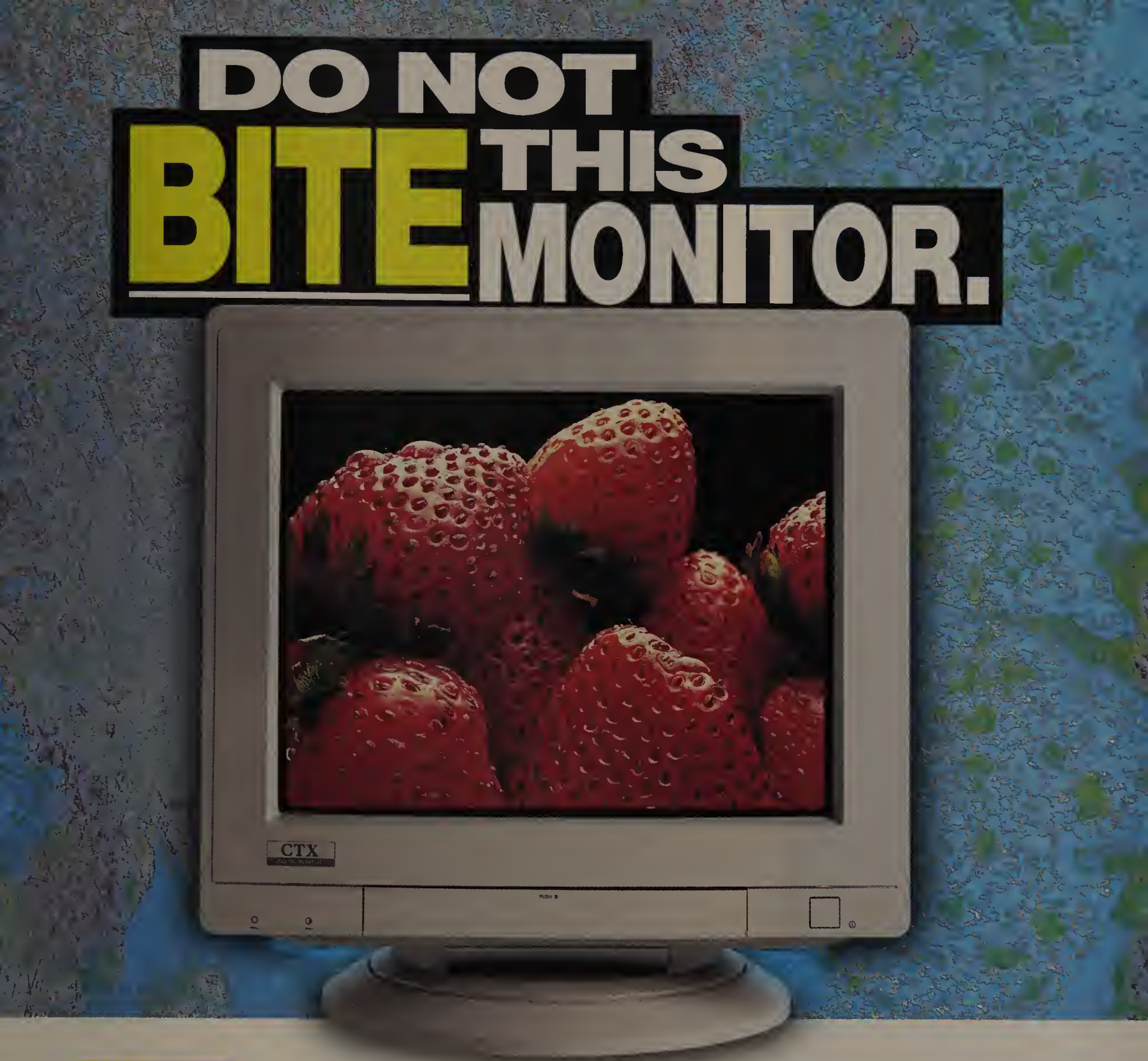
CD-recordable drives. As prices on CD-R drives fall, expect vendors to slip them into high-end PCs. These drives let you create your own CD-ROMs to hold multimedia presentations or a sampling of your favorite music. Gateway 2000 will be the first to ship a PC with a CD-R drive (for about $600 extra); it should be available by the time you read this.

3-D accelerator boards. They're just slightly more expensive than current video boards, but they speed up multimedia applications and business programs that make use of 3-D graphics. They'll start showing up in PCs this summer, but don't look for much in the way of 3-D software till the end of the year.

128-bit graphics controllers. Currently, virtually every PC on the market comes with a 64-bit graphics chip. New boards like Number Nine's Imagine128 Series 2 and STB's Lightspeed 128 have wider data paths for speeding today's more graphical applications.

Universal memory architecture. UMA eliminates the need for separate graphics memory in your PC by allocating a portion of main system RAM to act as a frame buffer. Skeptics, including Microsoft, are afraid UMA will hurt system performance, and early tests in our lab indicate they could be right.

DO NOT BITE THIS MONITOR.



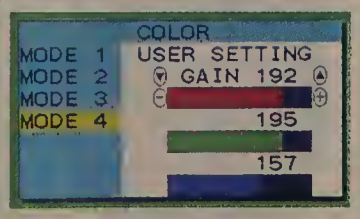
WARNING: The images you see on the new CTX PR900™ Professional Line Monitors are not real.

We say this because artists, graphic designers, and CAD/CAM users everywhere keep mistaking the PR900's sharp, distortion-free images for the objects they represent.

Maybe it's because the 21-inch PR900 offers the crispness of Diamondtron™ technology. With a colossal 19.6-inch viewable screen area and 0.31-mm aperture grille for uncommon contrast.

Or perhaps it's the PR900's 1600 x 1200 maximum resolution. And anti-glare, anti-static, anti-reflection screen. With vibrant colors that make other monitors pale in comparison.

In any case, with features like Windows® 95 Plug & Play, TCO '92 Certification, and Power Management—plus PC, Mac & SPARC compatibility—the PR900 is an unreal buy. Especially since it costs hundreds less than any monitor in its class.



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THE TOP 20

PC WORLD

POWER DESKTOPS

1 **Dell Dimension XPS P133c**
Going out on top.

	Last month	Months on chart	Last reviewed	Overall rating [1]	PC WorldBench score	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1 Dell Dimension XPS P133c	1	9	current	92	192	77/77	$3299	Pentium-133	16	1080
2 Dell OptiPlex GXMT 5133	4	4	Apr 96	89	184	77/77	$3355	Pentium-133	16	1624
3 Micron P133 Millennia	2	12	Mar 96	89	182	76/69	$2649	Pentium-133	16	1624
4 HP Vectra 500 Model 515MCx 5/166	–	1	current	88	192	78/66 [3]	$3345	Pentium-166	16	1624
5 Micron P166 Millennia Plus	3	6	Mar 96	86	198	76/69	$4148	Pentium-166	16	2150
6 Maximus Magna Media P-166	–	1	current	84	201	[3]	$2499	Pentium-166	16	2140
7 HP Vectra VL Series 4 5/166 MT	6	3	May 96	83	197	78/67 [3]	$3915	Pentium-166	16	1624
8 NEC PowerMate P133	5	6	Mar 96	82	185	70/68 [3]	$2679	Pentium-133	16	1624
9 Xi Computer P166MTower SP	–	1	Apr 96	82	199	[3]	$3199	Pentium-166	16	1280
10 Compaq Deskpro XL 5133	10	5	Mar 96	81	173	76/71	$4099	Pentium-133	16	1080
11 Gateway 2000 P5-133	11	5	Mar 96	81	186	68/69	$2639	Pentium-133	16	1624
12 Gateway 2000 P5-133XL	15	2	Jun 96	81	172	68/69	$2969	Pentium-133	16	1624
13 Quantex QP5/133 SM-2	–	1	current	80	186	63/63	$2599	Pentium-133	16	2000
14 Compaq Deskpro 5133	12	3	Mar 96	80	161	76/71	$3599	Pentium-133	16	1080
15 Cyrix 6x86-P166+ PC	–	1	current	80	199	[3]	$4639	Cx6x86-P166+	16	4000
16 Compaq ProLinea 5120	–	3	Mar 96	80	169	76/71	$2898	Pentium-120	16	1075
17 Digital Celebris GL 5166ST	7	2	Jun 96	80	198	74/67 [3]	$4999	Pentium-166	16	1600
18 Polywell Poly 5166P8	14	2	May 96	80	201	[3]	$2550	Pentium-166	16	1080
19 PerComp P166 Professional	–	1	May 96	79	192	[3]	$2899	Pentium-166	16	1080
20 Sys Technology Performance C166+	–	1	current	79	208	[3]	$2599	Cx6x86-P166+	16	1280

BEST BUY

[1] Percent contribution to overall rating: PC WorldBench score (25); reliability (25); features (20); price (15); service and support (15).
[2] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktop, Budget Desktop, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available June 26). You can also order a previous month's Top 20 chart with capsule reviews plus Features Comparison and Test Report ($4.50) and individual capsule reviews with Feature Comparison and Test Report ($1.50 each). Prices effective for the

2 Dell OptiPlex GXMT 5133
Good on its own or in a group.

3 Micron P133 Millennia
Power and quality for less.

4 HP Vectra 500 Model 515MCx 5/
Perfect for small or home offices.

5 Micron P166 Millennia Plus
With a SCSI twist.

CD-ROM drive	Bus slots	Monitor size/ dot pitch	Vendor contact number	Fax reprint number [2]	Reader service no.	Comments (Recommended as home system)
6X	ISA, PCI	17"/.28	800/613-3355	3299	763	Latest version of soon-to-be-replaced "c" series features speedy Imagine128 video card.
4X	ISA, PCI	17"/.28	800/613-3355	3339	764	Quick corporate PC with built-in networking; we also like the P-166 version for about $200 more.
6X	ISA, PCI	15"/.28	800/223-6571	3268	765	Quality system also comes in Top 20–caliber P-100, P-120, P-150, and P-166 flavors.
4X	ISA, PCI	15"/.28	800/752-0900	3383	766	New line for the home office; nice design includes voice mail, business software.
6X	ISA, PCI	15"/.28	800/223-6571	3331	767	Fast SCSI version of Micron's reputable Millennia line is priced with an Iomega Jaz drive.
6X	ISA, PCI	15"/.28	800/888-6294	3384	768	Super price for fast P-166 with lots of expansion room; also ranks on Budget chart.
4X	ISA, PCI	15"/.28	800/752-0900	3362	769	Well-designed, reliable PC aimed at large corporations; P-133 version also a good choice.
6X	ISA, PCI	15"/.28	800/632-4636	3330	770	Good price for speedy PC with fast CD-ROM drive and big hard drive; P-166 version also solid.
6X	ISA, PCI	17"/.26	800/432-0486	3385	771	Power system climbs onto chart due to new low price; comes with a 28.8-kbps fax-modem.
4X	EISA, PCI	15"/.28	800/345-1518	3340	772	Solid PC's price drops $400, but you pay a premium for built-in SCSI, networking, and EISA slots.
6X	ISA, PCI	17"/.26	800/846-2000	3346	773	A fine value, but Gateway's overall service and system reliability could still improve.
6X	ISA, PCI	17"/.26	800/846-2000	3373	774	Loaded with extras like wavetable sound, but mediocre performance for a P-133.
8X	ISA, PCI	17"/.26	800/896-4898	3386	775	Bigger hard drive, new 8X CD-ROM drive, and improved reliability rating boost it onto chart.
4X	ISA, PCI	17"/.28	800/345-1518	3344	776	Mainstream version of Deskpro XL benefits from $530 price drop; no built-in networking, slow.
6X	ISA, PCI	17"/.27	800/340-7501	3387	777	Chip maker moves into PCs; fast and feature rich but expensive; limited expansion.
–	ISA, PCI	17"/.28	800/345-1518	3388	778	High quality, especially the Compaq monitor, but pricey and slow for a P-120; no CD-ROM drive.
4X	ISA, PCI	15"/.28	800/344-4825	3338	779	Fast; built-in networking; but it's expensive, and reports of DOA components are on the rise.
4X	ISA, PCI	15"/.28	800/999-1278	3372	780	$145 price drop on already cheap P-166; not enough data to rate reliability and service.
6X	ISA, PCI	17"/.26	800/856-6688	3389	781	Inexpensive P-166 comes with Matrox graphics board and 4MB of WRAM.
6X	ISA, PCI	15"/.25 [4]	800/613-9963	3390	782	Ultrafast; low cost; quality components include 28.8-kbps fax-modem; support is sparse.

U.S. and Canada. Foreign orders are $15 for advance Top 20s, $8 for previous months' Top 20s, and $4 for individual reviews.
[3] Fewer than 100 Reliability and Service Monitor responses. Rating is based on responses for this company and the average of responses for all companies. No score is shown if we received fewer than 20 reliability or service responses.
[4] Stripe pitch.

For more information about all products in this table, circle reader service no. 911.

Top 20 Power Desktops

TWO OF THE PCs WE TESTED THIS MONTH EARN Best Buys on the Power Desktops chart: the $3299 Dell Dimension XPS P133c, a new version of the old favorite; and Hewlett-Packard's $3345 HP Vectra 500 Model 515MCx 5/166, a system designed for the small office/home office market. Other newly tested systems on this month's Power Desktops Top 20 chart include the $2499 Maximus Magna Media P-166, a low-cost speedster; and the $4639 Cyrix 6x86-P166+ PC and $2599 Sys Technology Performance C166+, both based on the new Cyrix 6x86-P166+ processor.

Two systems we tested in previous months make their way onto the chart for the first time. The $2599 Quantex QP5/133 SM-2 now comes with a bigger hard disk and a faster CD-ROM drive, while the $3199 Xi Computer P166MTower SP is now more reasonably priced and comes standard with a 28.8-kbps fax-modem.

Finally, Compaq recently slashed prices across its entire line of PCs, helping its systems hold their ground in the face of new competition.

Dell Dimension XPS P133c

NEW THIS MONTH

PROS: Fast, great graphics card, good reliability and service scores

CONS: High-end components add to price

Dell's Dimension "c" line won't be around much longer. It will soon be replaced by the company's "s" series, a new line that will use an upgraded Pentium chip set and a faster kind of memory called SDRAM. Look for our first reviews of these new machines in coming months. In the meantime, you might want to invest in a Dimension XPS P166c, XPS P133c, XPS P120c, or XPS P100c while Dell still makes them. These mainstays of our Power Desktops chart are still terrific machines.

Of the group, the XPS P133c has the best combination of price, performance, and features. It's one of the fastest Pentium-133s we've tested, and at $3299 it costs only a little more than the similarly configured $3249 Pentium-120 and $3199 Pentium-100 Dimensions. We've also tested Dell's XPS P166c, which will be the first to be replaced by an "s" version. It's not much faster than the XPS P133c, but the PC we tested costs almost $400 more.

For this issue we tested a fresh batch of Dell's "c" machines to see if performance had improved since we last evaluated them. Except for the XPS P120c, whose PC WorldBench score climbed 5 points to 182, speed was about the same. These Dimensions came in desktop cases instead of the minitowers we've reviewed before. The desktop-style cases are fairly expandable—they hold five add-in cards and five storage devices. Two slots and two drives bays remained open in our test systems, which were configured with a Sound Blaster AWE32 sound card, a U.S. Robotics V.34 fax-modem, and a 6X Teac CD-ROM drive, among other components.

Dell Dimension P133c

These Dimensions also came with a better graphics card than before, which raised their prices. The Number Nine Imagine128 is the fastest graphics board we've tested to date. (Only its high price keeps it off our monthly Top 10 Graphics Boards chart.) But if you don't do a lot of high-end graphics work, you don't really need it. You can lop about $330 off the system's price by using a less powerful controller, such as the Number Nine 9FX Motion771.

Dell OptiPlex GXMT 5133

LAST REVIEWED: April 1996

PROS: Network ready, 17-inch monitor, good networked or on its own

CONS: Integrated video chip is outdated

The $3355 OptiPlex GXMT 5133 offers the best of two worlds: Solid, helpful networking features that support most standards; and full multimedia hardware, including a quad-speed CD-ROM drive and built-in 16-bit sound. What's more, our test configuration included a large high-quality monitor. Hook up to a network or don't—the choice is yours—but remember, you're paying extra for the network compatibility. The system's only drawback is the integrated Trio64 graphics chip with 2MB of DRAM. It's good for straightforward Windows programs, but if desktop video is important to you, you'll want an add-in card with built-in video acceleration. Several boards on our Top 10 Graphics Boards chart use the video-enabled Trio64V+ chip and faster EDO DRAM.

Micron P133 Millennia

LAST REVIEWED: March 1996

PROS: Speedy, loaded with features, full multimedia

CONS: Reliability and service scores down slightly this month

Each month Micron's P133 Millennia edges closer to a spot on our Budget Desktops Top 20 chart. This month the company shaves another $50 off the price of this well-built minitower. At $2649, the system remains a tremendous bargain while delivering the power that you need for today's most demanding applications, including the bundled Microsoft Office Professional. It's loaded with memory, secondary cache, and hard disk space, as well as a 6X CD-ROM drive. The low price is partly due to the inclusion of a 15-inch

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monitor instead of a 17-inch model. Micron sells this system with a Hitachi SuperScan 17-inch monitor for $300 more.

All the other Millennias we've tested are good values, too, like the $3048 P166 Millennia (reviewed in April) or the $2848 P150 Millennia (reviewed in May). We haven't tested Micron's Home MPC systems, but the vendor says they're the same as the Millennias but with more multimedia titles plus a modem that includes voice mail. Micron's scores for system reliability and service are down this month in our fax-back survey—readers report higher DOA and overall problem rates.

4 HP Vectra 500 Model 515MCx 5/166

NEW THIS MONTH

PROS: Intelligent design, good software bundle, full multimedia, reliable

CONS: Wimpy graphics subsystem, shorter standard warranty than corporate VL line

If you have a small business, you'll appreciate the $3345 HP Vectra 500. Thanks to good bundled software and a voice fax-modem, this system will meet most of your business needs right out of the box. A nice set of communications programs will have you faxing, receiving voice mail, and surfing the Net in no time. For day-to-day business tasks, it comes with the ClarisWorks 4.0 integrated suite and Lotus Organizer 2.1.

The Vectra 500's PC WorldBench score of 192 is good for a Pentium-166 machine. The only thing holding the system up is its integrated Trio64 graphics chip with 1MB of DRAM. You should look into upgrading to 2MB of graphics memory. If you want accelerated full-motion video, you'll also need a card with a newer chip.

HP Vectra 500

The Vectra 500 includes unique design features; most notably, cards are inserted parallel to the motherboard in a vertical riser plane. This unusual arrangement saves space as well as eliminates stress on the motherboard when you swap add-in cards.

The Vectra 500 line is aimed at the small office/home office market, while the Vectra VL line is aimed at large corporations, so these systems have different support policies. On the downside, Vectra 500s come with just a one-year standard warranty, but their tech support hours are longer than the VLs' and include Saturdays.

5 Micron P166 Millennia Plus

LAST REVIEWED: March 1996

PROS: Good performance, 2GB SCSI hard drive, 1GB Jaz removable storage drive

CONS: Expensive, just a 15-inch monitor

Although $4148 is a lot to pay for a PC, consider that the P166 Millennia Plus features a SCSI hard drive; full multimedia, including a 6X CD-ROM drive, sound, and speakers; and an Iomega Jaz drive. If you don't need the Jaz removable storage, you can shave $400 off the price. You may want to spend that savings on a larger display: More than any other Millennia we've tested, the Plus model deserves a 17-inch monitor for displaying more information.

6 Maximus Magna Media P-166

NEW THIS MONTH

PROS: Sturdy; very fast; loaded configuration includes sound, speakers, and CD-ROM drive

CONS: One-year parts warranty, unknown track record for service and reliability

The $2499 Maximus Magna Media P-166 is inexpensive enough for the Budget chart but powerful enough to make the Power Top 20. It achieves a high PC WorldBench score of 201 thanks to its 16MB of EDO RAM, 512K of pipeline-burst cache, and a whopping 2.1GB hard drive. This sturdy Pentium-166 minitower also includes a slew of quality components, ranging from a Matrox Millennium graphics card with 2MB of WRAM to a 6X Teac CD-ROM drive to a Zoom V.34 fax-modem.

Maximus

Maximus offers a lifetime warranty on labor, but parts are covered for only a year. At this time we don't have any fax-back data to rate the company's reliability and service, but anecdotal evidence indicates Maximus needs to improve in both areas, so buyer beware.

7 HP Vectra VL Series 4 5/166 MT

LAST REVIEWED: May 1996

PROS: Well designed; high-performance Matrox graphics card; three-year warranty standard

CONS: Graphics card deserves a 17-inch monitor, no bundled software

Although HP's reliability and service scores are a bit lower this month, it's hard to argue with the quality of the systems we've tested. This $3915 P-166 is fast and well built. For a little less money, check out the $3615 Vectra VL 4 5/133 (reviewed in March).

8 NEC PowerMate P133

LAST REVIEWED: March 1996

PROS: Good performance, 6X SCSI CD-ROM drive, roomy hard drive

CONS: Reliability and service scores down slightly this month

9 Xi Computer P166MTower SP

LAST REVIEWED: April 1996

PROS: Fast, wavetable sound card, 17-inch monitor, 6X CD-ROM drive

CONS: Limited support hours, scant feedback from readers regarding reliability and service

10 Compaq Deskpro XL 5133

LAST REVIEWED: March 1996

PROS: Sturdy, built-in network adapter, SCSI hard drive, good system reliability

CONS: Expensive despite big price drop to $4099

11 Gateway 2000 P5-133

LAST REVIEWED: March 1996

PROS: Great price, solid performance, 17-inch monitor, roomy hard drive

CONS: Service score down slightly this month

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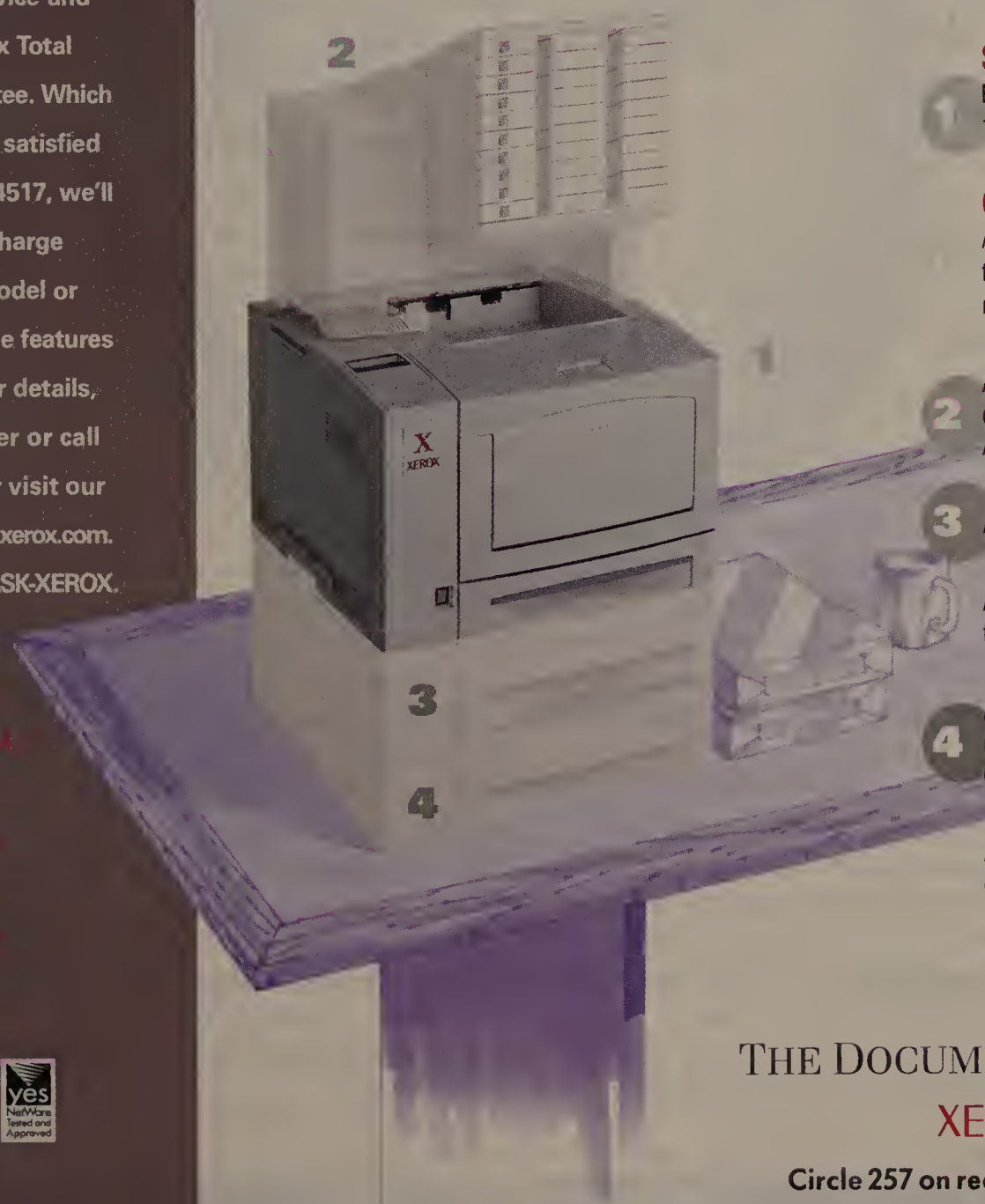

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12 Gateway 2000 P5-133XL

LAST REVIEWED: June 1996

PROS: Good price, wavetable sound card, 17-inch monitor, 6X CD-ROM drive, speakers

CONS: Service score down slightly this month

13 Quantex QP5/133 SM-2

NEW THIS MONTH

PROS: Low price, new 2GB hard drive, 17-inch monitor, full multimedia, 28.8-kbps fax-modem

CONS: Low reliability and service scores

Although we tested the Quantex QP5/133 SM-2 under PC WorldBench back in March, the system didn't make the power chart. Today you pay less—$2599—and get more, including a spacious 2GB hard drive. And while Quantex's reliability and service scores are low for a company in the Power chart, they're an improvement from a month ago. It's too early to declare a trend, but the latest responses to our fax-back survey are decidedly more positive than in the past, and the company tells us it's taken steps to further bolster reliability and service.

Quantex

14 Compaq Deskpro 5133

LAST REVIEWED: March 1996

PROS: Big price cut to $3599, nice 17-inch monitor, excellent system reliability

CONS: Pricey and slow for a Pentium-133

15 Cyrix 6x86-P166+ PC

NEW THIS MONTH

PROS: Good performance, huge SCSI hard drive, nice graphics system

CONS: Expensive; crowded interior

Although Cyrix is a relative newcomer to the PC business, the company has shown it can build a good system. The 6x86-P166+ PC, based on the 133-MHz 6x86-P166+ CPU, is a powerful Windows 95 system with top-notch components. Its PC WorldBench score of 199 is not as high as that of other systems based on the same chip, but it's definitely in line with this PC's main competition—Pentium-166 PCs.

Cyrix

The $4639 Cyrix PC is expensive for a system with this level of power, especially considering that part of Cyrix processors' appeal is their cost savings over Pentiums. The high price is due to the system's huge 4GB SCSI hard drive and Adaptec Ultra SCSI controller. With a 2.1GB IDE drive, the same PC goes for about $1300 less and compares favorably in value to top-tier P-166s.

The Cyrix PC's other features are also impressive: 17-inch CTX monitor, Matrox Millennium graphics card, Mitsumi 6X CD-ROM drive, Sound Blaster AWE32 sound card, Cambridge SoundWorks speaker system with subwoofer, and Supra 28.8-kbps fax-modem. Unfortunately, all the built-in components make for a crowded interior, and you can't upgrade RAM without yanking boards.

As you'd expect, we don't have any data on Cyrix's PC business to gauge the company's reliability and service. Cyrix backs each PC with a standard three-year warranty and round-the-clock support. Because the systems aren't yet common, getting through to tech support is a breeze, and the staff is helpful.

16 Compaq ProLinea 5120

LAST REVIEWED: March 1996

PROS: Good 17-inch monitor, plenty of room for expansion, outstanding reliability

CONS: Expensive and sluggish for a P-120, no CD-ROM drive

17 Digital Celebris GL 5166ST

LAST REVIEWED: June 1996

PROS: Strong performance; integrated sound, video, and ethernet adapter

CONS: Pricey for a PC with just a 15-inch monitor

18 Polywell Poly 5166P8

LAST REVIEWED: May 1996

PROS: Fast, inexpensive, full multimedia, five-year labor warranty

CONS: Limited support hours

19 PerComp P166 Professional

LAST REVIEWED: May 1996

PROS: 4MB Matrox graphics card, wavetable sound card, 17-inch monitor

CONS: No reader feedback on reliability and service

20 Sys Technology Performance C166+

NEW THIS MONTH

PROS: Fast, inexpensive, fully loaded, first-class components, 28.8-kbps fax-modem

CONS: Poor documentation, sparse support policies, unknown record for service and reliability

Sys's new Performance C166+ uses the Cyrix 6x86-P166+ and 16MB of RAM to achieve a PC WorldBench score of 208. That mark puts it among the five fastest systems we've tested. Even more impressive is its price. At $2599, the Performance C166+ delivers more for your dollar than almost any PC we've seen.

The high-quality 15-inch MAG Innovision DX15T monitor is a nice match for the Matrox MGA Millennium board with 2MB of WRAM. The wiring inside is jumbled, but the well-organized motherboard is easy to upgrade. Unfortunately, documentation is poor.

The system comes with a short one-year warranty, tech support hours are few, there's no toll-free support, and Sys offers no money-back guarantee.

Sys Technology

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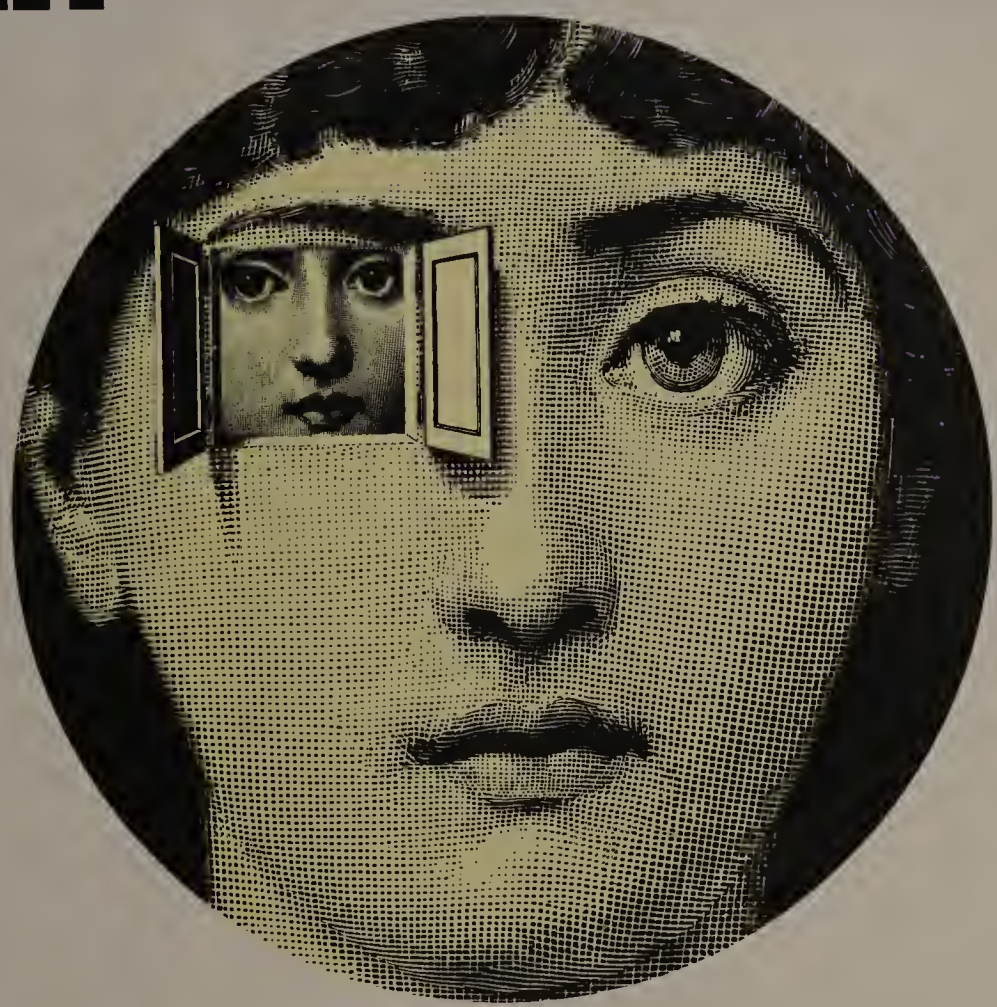

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THE PC WORLD TOP 20

BUDGET DESKTOPS

1 **Dell Dimension P100t**
High quality, low price.

	Last month	Months on chart	Last reviewed	Overall rating [1]	PC WorldBench score	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1 Dell Dimension P100t	–	1	current	93	173	77/77	$1879	Pentium-100	16	1600
2 Vektron Multimedia P-100	2	6	Mar 96	86	171	[3]	$1695	Pentium-100	16	2100
3 Quantex QP5/100 M-3	8	4	Apr 96	85	167	63/63	$1849	Pentium-100	16	1600
4 Gateway 2000 P5-120	–	6	Mar 96	85	176	68/69	$2099	Pentium-120	16	1624
5 Robotech Cobra XLT P-133	–	1	current	84	189	[3]	$2199	Pentium-133	16	1280
6 Netis N5133DPS	–	2	May 96	84	185	[3]	$1998	Pentium-133	16	1624
7 Micro Express MicroFlex-PCI/5133	16	4	Apr 96	84	190	[3]	$1999	Pentium-133	16	1624
8 Dell OptiPlex GL+575	6	3	Mar 96	84	121	77/76	$2111	Pentium-75	16	540
9 Tempest Pentium Giga Media P5-100	4	7	Mar 96	83	132	[3]	$1720	Pentium-100	16	1270
10 Micro Express MicroFlex-686/P120+	–	1	current	83	181	[3]	$1899	Cx6x86-P120+	32	1280
11 Maximus Magna Media P-166	–	1	current	82	201	[3]	$2499	Pentium-166	16	2140
12 Diamond OfficeMate P5120	–	1	current	82	164	[3]	$1645	Pentium-120	16	1624
13 Compaq ProLinea 575e	11	3	May 96	82	86	76/71	$1599	Pentium-75	8	630
14 Xi P133MTower SP	–	1	current	82	193	[3]	$2349	Pentium-133	16	1280
15 Polywell Poly 4120P8	18	7	Mar 96	81	73	[3]	$1495	AmDX4-120	8	1080
16 DTK Quin 54M/P100	3	5	Mar 96	81	148	68 [3]/[3]	$2050	Pentium-100	16	1080
17 HiQ Saturn Station	14	2	Jun 96	81	190	[3]	$2215	Pentium-166	16	1625
18 Austin PowerPlus 100	–	2	Mar 96	81	147	63 [3]/[3]	$2099	Pentium-100	16	850
19 Acma zPower 100	–	1	current	81	131	[3]	$2095	Pentium-100	8	1280
20 CompuTrend Premio 5x86-100	10	6	Mar 96	81	126	[3]	$1549	Cx5x86-100	16	1080

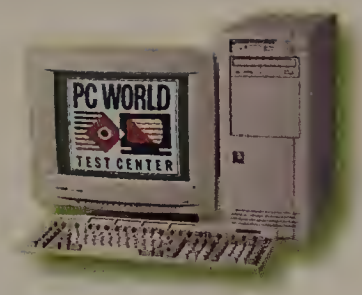
BEST BUY

[1] Percent contribution to overall rating: price (25); reliability (25); features (20); PC WorldBench score (15); service and support (15).
[2] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktop, Budget Desktop, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available June 26). You can also order a previous month's Top 20 chart with capsule reviews plus Features Comparison and Test Report ($4.50) and Individual capsule reviews with Feature Comparison and Test Report ($1.50 each). Prices effective for the

2 **Vektron Multimedia P-100**
Stretching a buck even further.

3 **Quantex QP5/100 M-3**
Beefed-up hard drive, CD-ROM.

4 **Gateway 2000 P5-120**
Lots of speed for the money.



5 **Robotech Cobra XLT P-133**
Practically a flat-out steal.

CD-ROM drive	Bus slots	Monitor size/ dot pitch	Vendor contact number	Fax reprint number[2]	Reader service no.	Comments (Recommended as home system)
6X	ISA, PCI	15"/.28	800/613-3355	3391	743	Heir apparent to P75t offers quality and speed at a good price; no speakers or modem.
6X	ISA, PCI	15"/.25	800/725-0026	3325	744	Upgraded hard drive and CD-ROM drive—at no extra cost. Still, Vektron lacks a support record.
8X	ISA, PCI	15"/.28	800/896-4898	3353	745	$50 price drop, more storage, improved system reliability move it to Best Buy ranks.
6X	ISA, PCI	15"/.25	800/846-2000	3392	746	$150 price drop moves well-built P-120 into Best Buy ranks ahead of impressive P-75 version.
6X	ISA, PCI	17"/.28	800/255-2215	3393	747	Fast, inexpensive PC for the home office, but documentation is spotty and support is weak.
4X	ISA, PCI	15"/.28	800/577-7526	3394	748	Price drop brings P-133 in under $2000; well configured, but reliability and service unknown.
4X	ISA, PCI	15"/.28	800/989-9900	3361	749	Fast, inexpensive system for under $2000; limited returns suggest below-average reliability.
4X	ISA, PCI	15"/.25	800/613-3355	3354	750	Only network-ready PC on budget chart, good business machine priced with small hard drive.
4X	ISA, PCI	15"/.28	800/818-5163	3356	751	Good price for multimedia PC with this much RAM and hard drive space; very expandable.
4X	ISA, PCI	17"/.28	800/989-9900	3395	752	Powerful system uses Cyrix chip to keep price down and adds extra RAM, but support in doubt.
6X	ISA, PCI	15"/.28	800/888-6294	3396	753	Super price for fastest budget PC; lots of room for expansion; also ranks on Power chart.
4X	ISA, PCI	15"/.28	800/989-7253	3397	754	Inexpensive no-frills business machine lacks sound and speakers.
—	ISA, PCI	15"/.28	800/345-1518	3366	755	$155 price drop on a solid, simple business machine; extras like a CD-ROM drive are optional.
6X	ISA, PCI	17"/.26	800/432-0486	3398	756	Big tower case, one of the most expandable we've seen; good features; limited tech support.
4X	ISA, PCI	15"/.28	800/999-1278	3357	757	$100 price drop keeps aging PC around; with outdated chip, it's by far the slowest here.
6X	ISA, PCI	15"/.28	800/289-2385	3351	758	Good value, but increasingly negative feedback for system reliability hurts its standing.
6X	ISA, PCI	15"/.28	800/827-5836	3379	759	Exceptionally low price for a multimedia P-166; forced down the chart by hot newcomers.
4X	ISA, PCI	15"/.28	800/752-1577	3399	760	Solid budget PC; decline in feedback makes reliability and service hard to gauge.
4X	ISA, PCI	15"/.28	800/786-6888	3400	761	Full-featured design includes two built-in PC Card slots; performance sluggish for a P-100.
4X	ISA, PCI	15"/.28	800/677-6477	3323	762	P-75 speed at a 486 price; fully loaded; limited support options make it difficult to get help.

U.S. and Canada. Foreign orders are $15 for advance Top 20s, $8 for previous months' Top 20s, and $4 for individual reviews.

[3] Fewer than 100 Reliability and Service Monitor responses. Rating is based on responses for this company and the average of responses for all companies. No score is shown if we received fewer than 20 reliability or service responses.

For more information about all products in this table, circle reader service no. 912.

Top 20 Budget Desktops

THE BUDGET CHART FEATURES SEVERAL NEW entries, including the top-ranked Dell Dimension P100t. At just $1879, it has ample speed, features, and quality for entry-level users. The $2199 Robotech Cobra XLT P-133 also claims a Best Buy, based on what it delivers for the money—P-133 speed and a 17-inch monitor. Other new entries include the $1899 Micro Express MicroFlex-686/P120+, based on the new Cyrix processor, and the $2499 Maximus Magna Media P-166, which also qualifies as a Top 20 *power* desktop.

Price cuts propel the $1998 Netis N5133DPS and the $1999 Micro Express MicroFlex-PCI/5133 up the chart to numbers six and seven, respectively. Meanwhile, Quantex has upgraded the hard disk and CD-ROM drive in its $1849 QP5/100 M-3, earning it a Best Buy.

1 Dell Dimension P100t

NEW THIS MONTH

PROS: Fast, inexpensive, highly upgradable

CONS: No speakers, no full-motion video acceleration

The $1879 Dimension P100t is a perfect entry-level PC for business users on a tight budget. It's fast, well built, and easy to upgrade. With a PC WorldBench score of 173, the Dimension P100t is not only one of the fastest P-100s, it also delivers some of the best performance for the money of all the systems we've seen, regardless of CPU. However, don't count on it to be the perfect multimedia PC. Although the P100t comes with a 16-bit sound card, speakers are optional; and despite its 2MB of graphics memory, the integrated Trio64 graphics chip can't speed up full-motion video clips. If your budget permits, think about spending an extra $250 for some basic speakers and a 2MB video-enabled board. Even with that added cost, the Dimension P100t would rank at the top of our Budget chart.

Dell Dimension P100t

The Dimension P100t has a standard desktop design, with the on/off button placed to one side so you can't confuse it with the floppy eject button. The interior is clean and accessible, but you might want to move the sound card closer to the CD-ROM drive so the wire that connects the two won't interfere with other add-in cards. Overall, there's room for five more cards and two additional storage devices.

This model is priced with a three-year parts warranty, but as of press time Dell's standard warranty was one year (an upgrade to three years costs $199). Our fax-back survey indicates Dell's problem rate has fallen recently, which accounts for the slight rise in its reliability score. Readers continue to be happy with Dell service.

2 Vektron Multimedia P-100

LAST REVIEWED: March 1996

PROS: Ultralow price, big 2GB hard drive, 6X CD-ROM drive

CONS: One-year warranty, no weekend support

The $1695 Vektron Multimedia P-100 is a great deal that keeps getting better. Vektron has installed a 2GB hard drive and 6X CD-ROM drive in this speedy P-100 minitower without increasing cost. However, we only recently added Vektron to our fax-back survey, so we don't have enough feedback to gauge the company's reliability and service. When we called tech support, a recorded message encouraged us to fax or e-mail our questions to the company. Times on hold can be long. If you're good with PCs and can fix problems if they arise, though, Vektron deserves your consideration. And if you're trying to stretch a buck as far as it will go, you can't do better than the Multimedia P-100.

3 Quantex QP5/100 M-3

LAST REVIEWED: April 1996

PROS: Good performance, full multimedia, fax-modem, 8X CD-ROM drive

CONS: Reliability score, though improved, is still mediocre

The $1849 QP5/100 M-3, a family-oriented multimedia system, comes with a bunch of games, PerfectWorks integrated software, and several online start-up kits. It's a good choice for home offices that also use the PC for entertainment. New features like a 1.6GB hard drive, an 8X CD-ROM drive, and a 28.8-kbps fax-modem with voice mail boost this minitower near the top.

If you want a little extra power, consider the $2099 QP5/120 M-4. We tested it this month for the first time and found it fast, with the same high-quality design as the QP5/100 M-3. Although our M-4 test unit came with a 15-inch monitor, a 1.6GB hard drive, and a 6X CD-ROM, Quantex has since upped the ante by offering the M-4 line standard with a 17-inch monitor, a 2GB hard drive, and an 8X CD-ROM. These changes are likely to increase price slightly, so call the vendor for the latest figure.

4 Gateway 2000 P5-120

LAST REVIEWED: March 1996

PROS: Good performance, 6X CD-ROM drive, Microsoft Office Professional Edition

CONS: No sound

Thanks to a price drop of $150 and a bigger standard hard drive of 1624MB, the P5-120 emerges as Gateway 2000's best budget PC. At $2099 it's an excellent deal, but you'll need to cough up another

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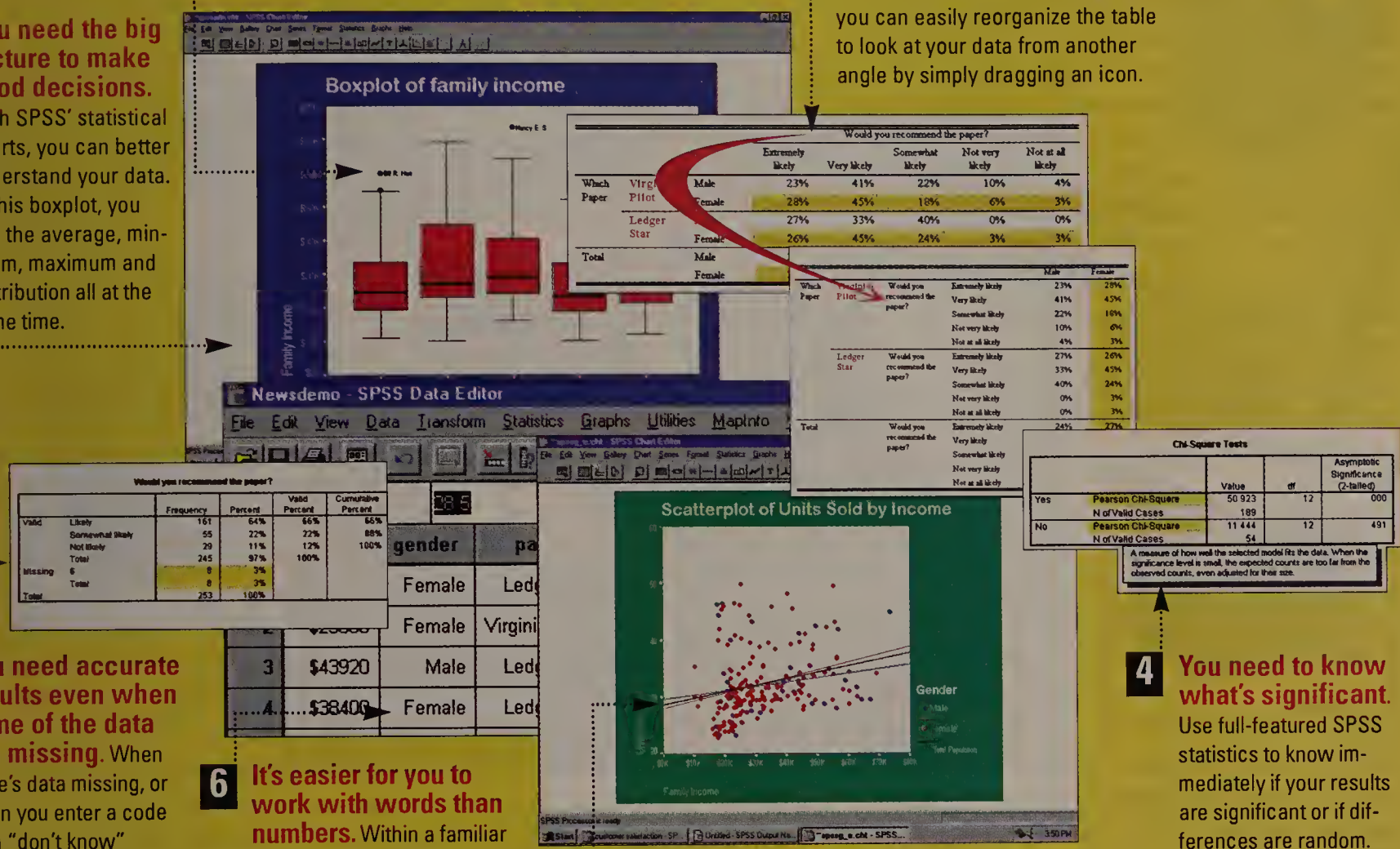

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$100 for a sound card and speakers. Add still another $149 if you want a 28.8-kbps fax-modem. Other good Gateway PCs for people on a budget are the highly affordable $1594 P5-75 (reviewed in March), and the fully configured $2229 P5-100 Family PC (reviewed in April).

5 Robotech Cobra XLT P-133

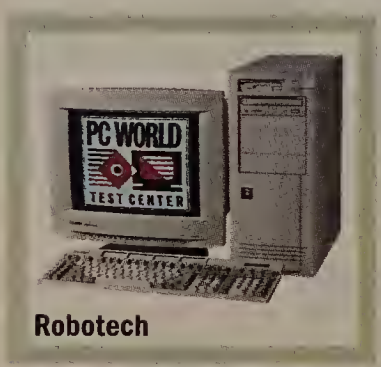
NEW THIS MONTH

PROS: Fast, good price, full multimedia, 17-inch monitor, 28.8-kbps Boca fax-modem

CONS: Limited support hours, poor documentation, unknown record for service and reliability

The $2199 Robotech Cobra XLT P-133 is an office workhorse. In addition to plenty of memory and hard drive space, it has a fast graphics system for running business programs. Its Number Nine 9FX Motion331 video-enabled card with 2MB of EDO DRAM is paired with a good Cobra 17-inch monitor. A 6X Mitsumi CD-ROM drive and Sound Blaster 16 sound card handle the multimedia duties.

The Cobra XLT P-133's PC WorldBench score of 189 is high for its processor class, equaling the marks of some of the Pentium-166 systems that we've tested. The minitower's major drawbacks are its poor documentation and internal cable clutter. We do not have enough fax-back data to rate the quality of Robotech's reliability and service, but spot calls to the company's technical support line have yielded disappointing results. Phone support is limited to weekday business hours. The system itself is a winner at a low price, but you take a chance when ordering from a relatively small vendor like Robotech.



Robotech

6 Netis N5133DPS

LAST REVIEWED: May 1996

PROS: Under $2000, good PC WorldBench score, lots of features

CONS: One-year parts warranty, no feedback to gauge reliability and service

In addition to this bargain-basement $1998 Pentium-133, other Netis desktop systems that we've tested rate well if you're looking for a budget system. Among them are the $1911 Netis N5100 Media (reviewed in May) and the $1980 Netis N5120 Media (reviewed in April).

7 Micro Express MicroFlex-PCI/5133

LAST REVIEWED: April 1996

PROS: Fast, low price for a P-133, full multimedia

CONS: Tech support hard to reach, requires toll call after business hours

8 Dell OptiPlex GL+575

LAST REVIEWED: March 1996

PROS: Intelligent design, network ready, good P-75 performance, top-notch support

CONS: Pricey for a Budget Top 20 P-75, small hard drive, limited expandability

9 Tempest Pentium Giga Media P5-100

LAST REVIEWED: March 1996

PROS: Good price, full multimedia, fax-modem

CONS: Slow for a P-100, no fax-back data to gauge reliability and service

10 Micro Express MicroFlex-686/P120+

NEW THIS MONTH

PROS: Low price, high performance, 17-inch monitor

CONS: Skimpy documentation, clunky design, tech support hard to reach

The boxy $1899 Micro Express minitower is based on the speedy Cyrix 6x86-P120+ processor running at 100 MHz. Cyrix processors continue to impress us with their speed in handling business applications. With a PC WorldBench score of 181, this MicroFlex is on a par with far more expensive Pentium-120 and Pentium-133 PCs. Micro Express took the money it saved on the CPU and put it toward 32MB of RAM, adding to the system's speed. The unit also comes with a 17-inch monitor and a professional-level ATI Graphics Pro Turbo video card with 2MB of VRAM. Unfortunately, Micro Express skimps on documentation and application software. In addition, the system's interior is extremely cluttered, and its keyboard feels particularly cheap and poorly built.

Micro Express P120+

We don't have much reader feedback on Micro Express, but what we do have indicates that its PCs have below-average reliability. Phone support after business hours requires a toll call. In our experience, getting through can be near impossible. In its favor, Micro Express has a 30-day money-back guarantee and a two-year warranty. If you want the biggest bang for your buck, don't ignore the MicroFlex-686/P120+.

11 Maximus Magna Media P-166

NEW THIS MONTH

PROS: Fastest budget PC; sturdy; loaded configuration includes sound, speakers, and CD-ROM

CONS: One-year parts warranty, unknown track record for service and reliability

At just $2499, the Maximus Magna Media P-166 is extremely easy on the wallet. With a PC WorldBench score of 201, it's also quite powerful. In fact, with its stellar combination of speed and features, the Magna Media P-166 almost earns a Best Buy on the *Power* chart. For a complete write-up, check its entry in the Power Desktops section.

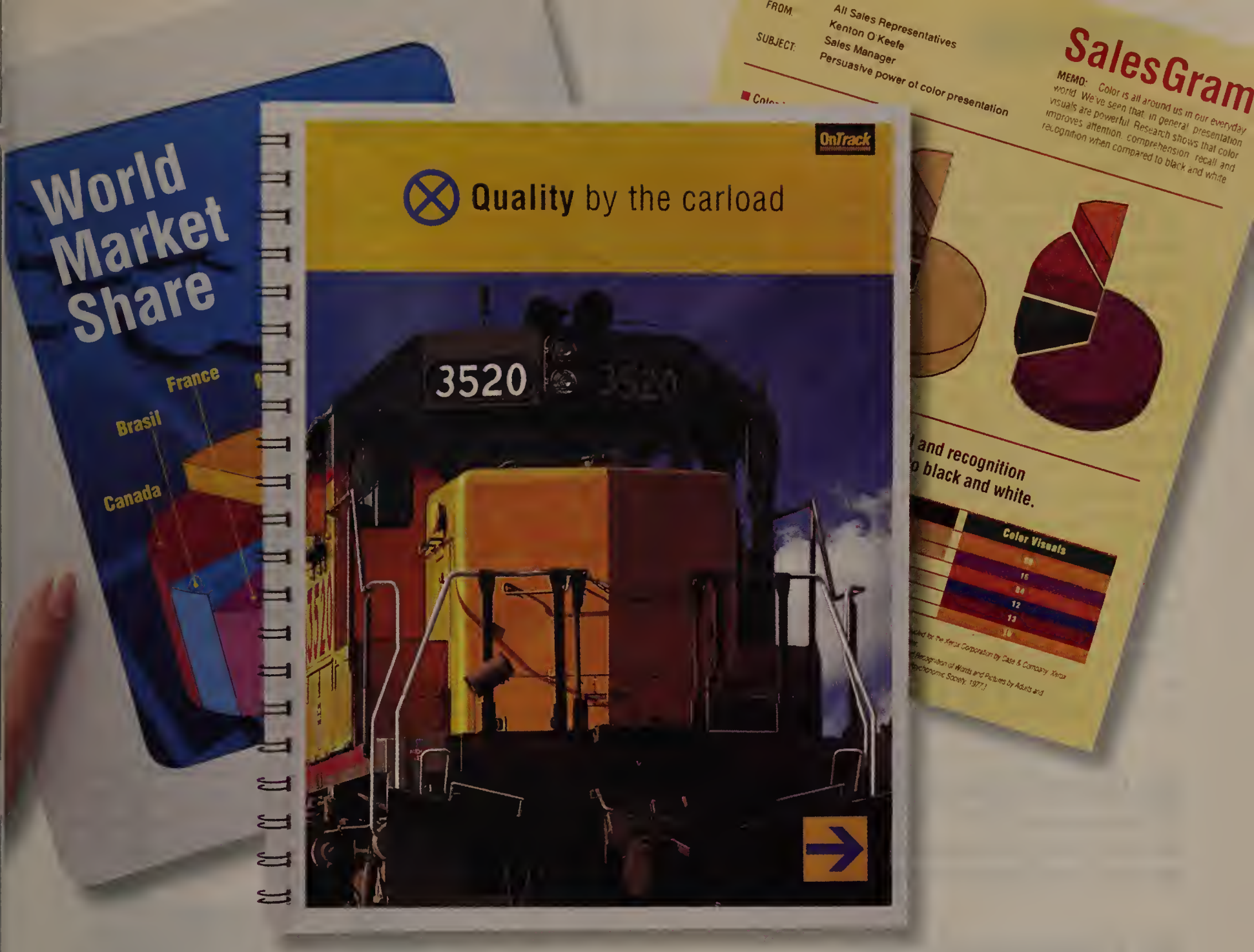
12 Diamond OfficeMate P5120

NEW THIS MONTH

PROS: Low price, sturdy design, fully loaded

CONS: No sound card, no application software, poor documentation

The Diamond OfficeMate P5120 comes with just about everything you want in a PC—plenty of memory, a big hard drive, and a



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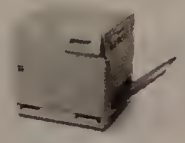
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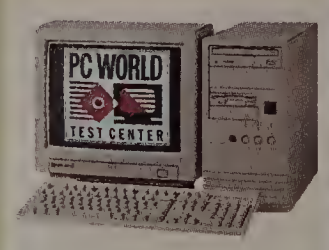
fax-modem—but you wouldn't know from its price tag. Similarly configured Pentium-120s typically cost upwards of $2000, but the OfficeMate goes for just $1645.

About all that's missing is a sound card. And you probably won't use this PC to connect to the World Wide Web because the included modem does just 14.4 kbps (you really need a 28.8-kbps modem for surfing the Web). But for sending e-mail, writing proposals, and keeping track of information, the OfficeMate fits the bill.



Diamond

Although the P5120's PC WorldBench score of 164 is average for a Pentium-120, it's high for a PC in this price range. The combination of an Impression 15-inch monitor and a Diamond Stealth64 Video 2201XL graphics card (ranked third on this month's Top 10 Graphics Boards chart) is good for mainstream applications. However, we were disappointed that the system doesn't come with application software. Also, its documentation leaves a little to be desired.

Other Diamond PCs that score well in the budget category are the $1499 DT-100 (reviewed in March) and the $1895 DT Super-150 (tested in June).

13 Compaq ProLinea 575e

LAST REVIEWED: May 1996

PROS: Well built, low price, great record for reliability

CONS: Skimpy configuration, slow due to lack of cache

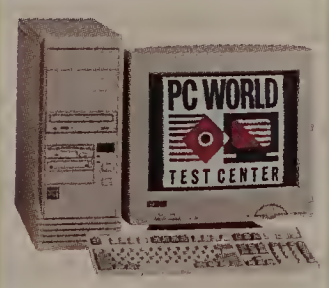
14 Xi P133MTower SP

NEW THIS MONTH

PROS: Fast, good price, 17-inch monitor, 6X CD-ROM drive, highly expandable

CONS: Limited tech support hours, unknown track record for service and reliability

We tested this system back in March; now a $150 price drop puts the $2349 tower on the Budget Desktops chart. With a PC WorldBench score of 193, it's very fast for a Pentium-133 PC. It's also one of three Top 20 budget desktops to include a 17-inch monitor (the other two are from Robotech and Micro Express). The Xi system's seven free drive bays and five free add-in slots are also highly commendable. We haven't learned much about Xi Computer yet from our reader fax-back survey. The company offers a three-year warranty, but technical support is confined to weekday business hours.



Xi Computer

15 Polywell Poly 4120P8

LAST REVIEWED: March 1996

PROS: Dirt cheap, full multimedia

CONS: Slow; outdated AmDX4-120 CPU; poor monitor; just 8MB of RAM

16 DTK Quin 54M/P100

LAST REVIEWED: March 1996

PROS: Good upgradability, full multimedia, 6X CD-ROM drive

CONS: Some cable clutter, lower reliability score drops ranking

17 HiQ Saturn Station

LAST REVIEWED: June 1996

PROS: Great price for a P-166 PC, 6X CD-ROM drive, good expandability

CONS: So-so monitor, unknown track record for service and reliability

18 Austin PowerPlus 100

LAST REVIEWED: March 1996

PROS: Nice design, full multimedia, fax-modem, great system manual

CONS: Mediocre score for reliability, smallish 850MB hard drive

19 Acma zPower 100

NEW THIS MONTH

PROS: Two PC Card slots, full multimedia, 28.8-kbps fax-modem, well built

CONS: Sluggish performance for a P-100

Even low-cost PCs can surprise you with unexpected features. The $2095 Acma zPower 100 comes with a frill we don't see very often in desktop PCs—a pair of PC Card slots. If you use both a notebook and a desktop, the slots are perfect for exchanging data. Serial cable or infrared links can be cumbersome and require that both systems be in the same location when you want to move files.

Acma

Overall, the zPower 100 is well designed. Its case is sturdy and nicely styled, its motherboard clean and uncluttered. The graphics system is solid but not spectacular. The Acma system's 15-inch Impression 5 monitor and Diamond Stealth64 Video 2201 graphics card will serve you well for business applications, although they're not suited for high-end desktop publishing or image editing. Unfortunately, the zPower 100's PC WorldBench score of 131 is below average for a Pentium-100, likely due to its minimal 8MB of RAM.

To get you up and running, Acma bundles a few software programs, including Microsoft Works and Encarta, and we were pleased with the documentation. The system warranty covers parts for three years and labor for one, and you get a year of free on-site service. We've gotten very little feedback on Acma's reliability and service, though, and we can't determine how well the company follows through on its support policies.

20 CompuTrend Premio 5x86-100

LAST REVIEWED: March 1996

PROS: Low price for a loaded system with multimedia; performs like a P-75

CONS: Limited support hours, no toll-free or weekend support

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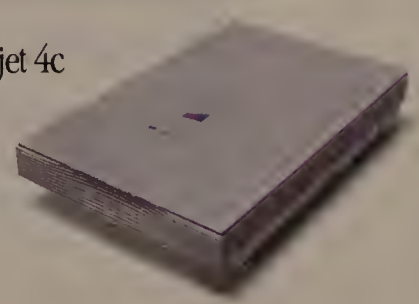
HP Scanjet 4c



Circle 250 on reader service card

[1] 33-bit equivalent with the analog gamma correction. [2] Average street price from sampled advertisements in Computer Shopper May, 1996.

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THE PC WORLD TOP 20

NOTEBOOK PCs

1 Gateway 2000 Solo S5-120XL
Can't cram more into a notebook.

POWER SYSTEMS

		Last month	Months on chart	Last reviewed	Overall rating [1]	PC WorldBench score	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)	Multi media
1	Gateway 2000 Solo S5-120XL	–	1	current	92	153	74/65 [4]	$5599	Pentium-120	40	1358	sound/CD
2	Toshiba Tecra 700CT	4	2	Jun 96	91	141	85/80	$5333	Pentium-120	16	1215	sound/CD
3	Toshiba Satellite Pro 400CDT	5	7	Mar 96	91	124	85/80	$4458	Pentium-75	16	810	sound/CD
4	Dell Latitude XPi P120ST	3	2	Jun 96	90	138	79/70 [4]	$4299	Pentium-120	16	810	–
5	WinBook XP5 P120	1	4	Apr 96	88	146	58/74	$3499	Pentium-120	16	1295	sound
6	AST Ascentia J30	–	1	current	87	117	70/68 [4]	$3299	Pentium-100	8	810	sound
7	Toshiba Portégé 610CT	7	6	Mar 96	87	99	85/80	$3949	Pentium-90	8	720	sound
8	Texas Instruments TravelMate 5100	10	3	Mar 96	84	125	64 [4]/[4]	$3899	Pentium-90	16	1160	sound
9	NEC Versa 4080H	9	4	Apr 96	84	132	71/[4]	$5474	Pentium-120	16	1080	sound/CD
10	IBM ThinkPad 760C	6	3	May 96	83	121	68/76	$6184	Pentium-90	16	720	sound

BUDGET SYSTEMS

1	Toshiba Satellite 100CS	2	2	Jun 96	91	87	85/80	$1999	Pentium-75	8	540	–
2	Toshiba Satellite T2130CS	3	5	Mar 96	91	65	85/80	$1599	DX4-75	8	503	–
3	Toshiba Satellite T2130CT	–	1	Jun 96	89	66	85/80	$2099	DX4-75	8	503	–
4	Dell Latitude XPi P75D	4	2	Mar 96	87	106	79/70 [4]	$2499	Pentium-75	16	540	–
5	Mega Image MegaBook 880	5	2	Jun 96	85	118	[4]	$2395	Pentium-90	16	543	sound
6	Sharp PC 3020	8	2	Jun 96	83	79	[4]	$1799	Cx5x86-100	8	500	–
7	AST Ascentia 950N	10	3	May 96	82	83	70/68 [4]	$2455	Pentium-75	8	810	sound
8	ZDS Z-Note MX	–	1	current	80	91	[4]	$2199	Pentium-75	8	540	–
9	WinBook XP5 P75	11	1	Jun 96	79	90	58/74	$2399	Pentium-75	8	543	sound
10	MPC TouchNote 1000	–	2	Mar 96	77	74	62/64	$1995	Pentium-75	8	518	sound

BEST BUY

[1] Percent contribution to overall rating for power notebook: PC WorldBench score (22); reliability (22); features and design (16); price (14); service and support (10); battery (8); weight (8). Percent contribution to overall rating for budget notebooks is the same except for price (22) and PC WorldBench score (14). [2] CA=color active, CD=color dual-scan, CP = color passive. [3] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktop, Budget Desktop, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available June 26). You can also order a previous month's Top 20 chart with capsule

2 **Toshiba Tecra 700CT**
The Rolls Royce of portables.

1 **Toshiba Satellite 100CS**
Pentium power on a tight budget.

2 **Toshiba Satellite T2130CS**
Quality doesn't usually come this cheap.

	Weight (pounds)	Battery life (hours)	Screen type/ size [2]	Vendor contact number	Fax reprint number [3]	Reader service no.	Comments
	8.8	5:40	CA/10.4"	800/846-2000	3758	783	With all that RAM, it's a high-end desktop that fits in your briefcase; it runs for hours.
	10.4	4:43	CA/11.3"	800/457-7777	3751	784	The best in Toshiba's new high-end line; big bright screen; dual-scan model also a good buy.
	9.0	4:21	CA/10.4"	800/457-7777	3728	785	Fast notebook is perfect as your only PC, 410CDT model also is impressive.
	7.4	4:43	CA/10.4"	800/613-3355	3750	786	Good price for a super-VGA P-120, even though it lacks multimedia; P90ST costs $500 less.
	7.4	6:19	CA/10.3"	800/468-2162	3736	787	Great deal, fast; nice keyboard; for $200 less, check out the P-90 version.
	6.6	5:12	CA/10.4"	800/876-4278	3759	788	Sturdy, lightweight road warrior might benefit from an extra 8MB of RAM.
	6.4	5:09	CA/9.5"	800/457-7777	3752	789	One of few subnotes that have caught on; nice screen, relatively comfortable keyboard.
	7.4	5:06	CA/10.4"	800/848-3927	3714	790	Pricey for a P-90 notebook; not enough data to gauge recent reliability and service.
	8.2	3:35	CA/10.4"	800/632-4636	3741	791	Costs a lot and has short battery life, but it's a good desktop replacement.
	8.2	5:09	CA/12.1"	800/772-2227	3747	—	Expensive system performs well; big display, long battery life, but reliability score declines.
	7.6	3:35	CD/10.4"	800/457-7777	3754	792	Low price, Pentium processor, high reliability rating—a perfect first notebook.
	7.2	3:01	CD/10.4"	800/457-7777	3744	793	The logical second choice if you want to spend less and don't mind slower performance.
	7.2	5:29	CA/10.3"	800/457-7777	3760	794	Active-matrix version of no. 2 Best Buy runs for a long time.
	7.4	3:28	CD/10.3"	800/613-3355	3713	795	Fast, well-built budget notebook from a reliable vendor.
	7.4	3:06	CA/10.3"	800/250-1876	3755	796	Low price for a fast notebook with active screen; reliability and service are unknowns.
	7.2	4:28	CD/10.4"	800/237-4277	3757	797	Low-cost alternative to Pentium-75 notebooks features long battery life, good screen.
	7.2	5:11	CA/10.3"	800/876-4278	3729	798	Best battery life you can get for the money; slow for a P-75 budget notebook.
	7.2	2:02	CD/10.4"	800/582-0524	3761	799	On a par with no. 1 Toshiba, but a bit more expensive, with far shorter battery life.
	7.8	3:27	CA/10.3"	800/468-2162	3762	800	Nice screen, built-in 14.4-kbps fax-modem are pluses, but reliability rating is low.
	7.6	3:46	CP/10.4"	800/672-9979	3763	801	Editor's note: At press time MPC Technologies was ceasing operations.

reviews plus Features Comparison and Test Report ($4.50) and individual capsule reviews with Feature Comparison and Test Report ($1.50 each). Prices effective for the U.S. and Canada. Foreign orders are $15 for advance Top 20s, $8 for previous months' Top 20s, and $4 for individual reviews. [4] Fewer than 100 Reliability and Service Monitor responses. Rating is based on responses for this company and the average of responses for all companies. No score is shown if we received fewer than 20 reliability or service responses.

For more information about all products in this table, circle reader service no. 913.

Top 20 Notebook PCs

OUR NEW NUMBER ONE POWER NOTEBOOK—THE $5599 Gateway 2000 Solo S5-120XL—was fully loaded when we tested it. For about $1200 less, it's also available with 16MB and an 810MB hard drive.

Besides the $2199 ZDS Z-Note MX, on our chart for the first time, the chief news among budget notebooks concerns discontinued models. Dell cut loose its Latitude LX 4100D, which held the top spot last month, in favor of an all-Pentium line of notebooks, due out soon. As a result, the $1999 Toshiba Satellite 100CS ascends to budget number one. Meanwhile, MidWest Micro suspended all notebook operations, and Hertz Computer stopped selling its Z-Optima 486D100 X4E.

1 Gateway 2000 Solo S5-120XL

NEW THIS MONTH

PROS: Blazing speed, tons of memory, 5.7-hour battery life, CD-ROM drive

CONS: Expensive

We tested the new Gateway 2000 Solo P-120 in its $5599 "Best Buy" configuration. Basically that means it came loaded to the rafters, with 40MB of RAM and a 1.3GB hard drive. With that much power, it's no wonder this sleek notebook is the fastest on the chart. You can also get it with 16MB for $1200 less.

Gateway Solo

Our Solo also came with a pleasing 10.4-inch active display, but Gateway now outfits its "Best Buy" model with an equally impressive 11.3-inch screen at no extra cost. There's also a 28.8-kbps PC Card fax-modem, a removable quad-speed CD-ROM drive, and Office 95 Professional.

2 Toshiba Tecra 700CT

LAST REVIEWED: June 1996

PROS: Good performance, optional quad-speed CD-ROM drive, top-rated reliability

CONS: Expensive, a bit hefty

The Tecra 700CT P-120 is fast and loaded. The standard unit has an 11.3-inch active screen and 16MB of RAM. At $5333 it's not cheap, but this price includes an optional quad-speed CD-ROM drive. If you don't want to spend over $5000, consider the $4333 Tecra 700CS. The chief differences between this notebook and the 700CT are its dual-scan screen and standard 8MB of RAM.

3 Toshiba Satellite Pro 400CDT

LAST REVIEWED: March 1996

PROS: Fast, good battery life, quad-speed CD-ROM drive, highly rated reliability

CONS: Expensive for a P-75 notebook

4 Dell Latitude XPi P120ST

LAST REVIEWED: June 1996

PROS: Fair price for a P-120 notebook, light weight, good reliability

CONS: No sound chip or CD-ROM drive

The $4299 Latitude XPi P120ST is similar to previously reviewed Pentium-based Latitudes except for its super-VGA (800 by 600) active-matrix display. This month we also looked at the Pentium-90 version. The $3799 XPi P90ST's 5-hour battery life and PC WorldBench score of 126 are both strong.

5 WinBook XP5 P120

LAST REVIEWED: April 1996

PROS: Fast; light weight; amply configured; long battery life; built-in fax-modem

CONS: One-year warranty, low reliability rating

6 AST Ascentia J30

NEW THIS MONTH

PROS: Nice super-VGA screen, 5-hour battery life, light weight, sleek design

CONS: Sluggish performance for a P-100 notebook

AST

The $3299 AST Ascentia J30 is a stylish 6.6-pound unit with a vivid 800 by 600 active-matrix screen. Additional features include an internal 14.4-kbps fax-modem, 16-bit sound, built-in speakers, and an infrared port. This Pentium-100 notebook scored 117 in our PC WorldBench test suite—slower than many Pentium-90 notebooks. You can chalk the sluggishness up to a scant 8MB of RAM.

7 Toshiba Portégé 610CT

LAST REVIEWED: March 1996

PROS: Sturdy subnotebook with good sound and video; nice active-matrix screen

CONS: Minimal 8MB of RAM yields below-average performance

8 Texas Instruments TravelMate 5100

LAST REVIEWED: March 1996

PROS: Fast P-90 performance, 5-hour battery life, big hard drive

CONS: No weekend tech support

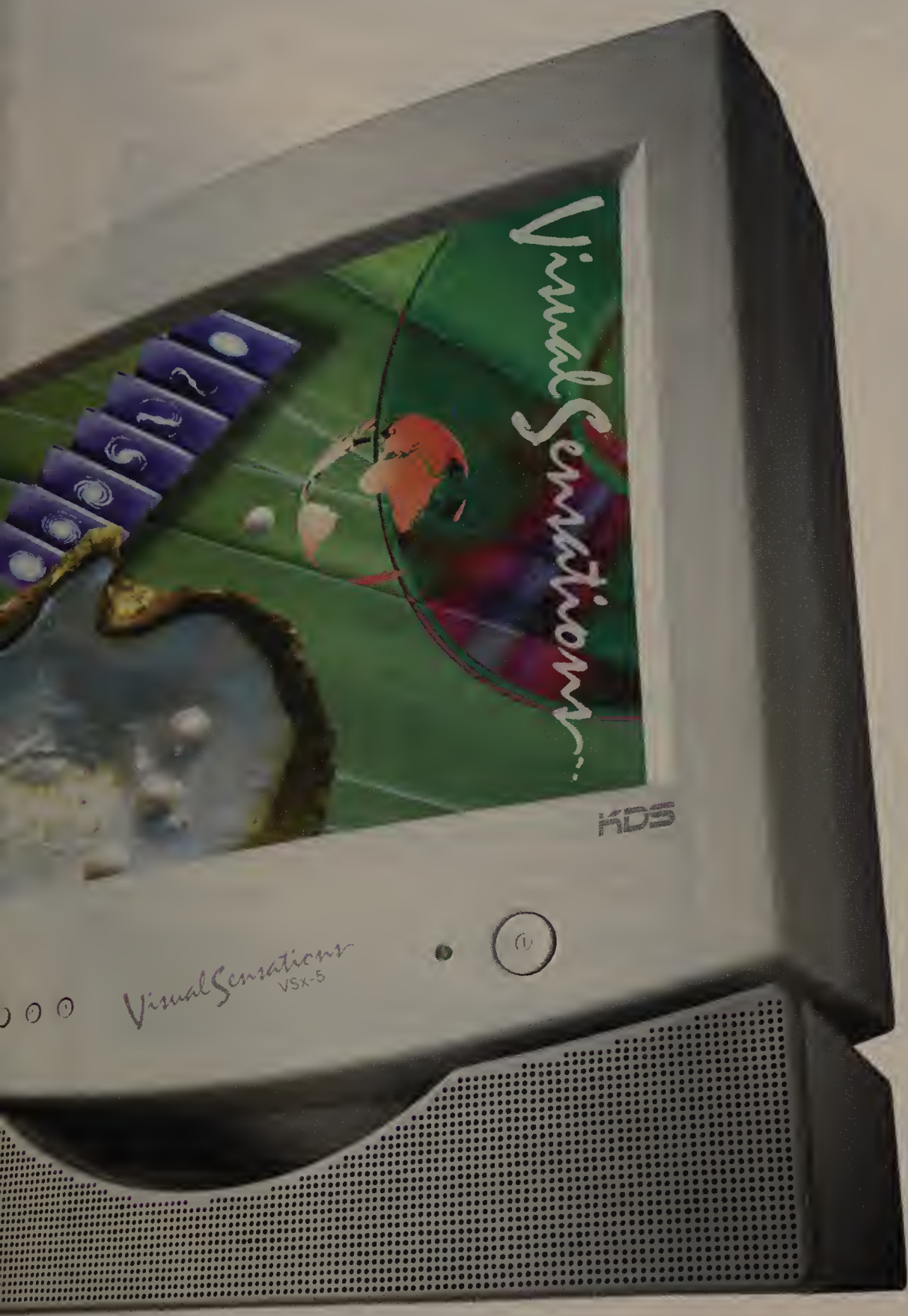
9 NEC Versa 4080H

LAST REVIEWED: April 1996

PROS: Good performance, nice keyboard, quad-speed CD-ROM drive

CONS: Expensive, muted screen colors, short battery life for a power notebook

Simply Sensational.



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10 IBM ThinkPad 760C

LAST REVIEWED: May 1996

PROS: High quality; superior 12.1-inch screen; fast; long battery life

CONS: Expensive, no CD-ROM drive

Budget Notebooks

1 Toshiba Satellite 100CS

LAST REVIEWED: June 1996

PROS: Good deal on a high-quality Pentium-75 notebook from a reliable vendor; nice keyboard

CONS: Hard drive not removable

The $1999 Satellite 100CS is Toshiba's first Pentium budget notebook. Because it comes with 8MB of RAM, it can't match the performance of the 16MB Satellite Pro 400CDT power system, but it holds its own among notebooks in its price range.

2 Toshiba Satellite T2130CS

LAST REVIEWED: March 1996

PROS: Inexpensive, nice dual-scan screen, good keyboard

CONS: Slow; aging DX4-75 CPU

At $1599, the Satellite T2130CS is priced to move. Intel DX4 notebooks are about to disappear, so now is the time to get good deals on the last of them. The T2130CS doesn't have the oomph for intense applications such as graphics programs, but its high-quality design makes it a good first notebook if you want to run basic business apps on the road.

3 Toshiba Satellite T2130CT

LAST REVIEWED: June 1996

PROS: Long 5.5-hour battery life, active-matrix screen, nice keyboard

CONS: Sluggish performance, old DX4-75 CPU

4 Dell Latitude XPi P75D

LAST REVIEWED: March 1996

PROS: Speedy, good design and construction, reliable, lots of RAM for the price

CONS: Short battery life considering the 16MB of memory

5 Mega Image MegaBook 880

LAST REVIEWED: June 1996

PROS: Good performance thanks to 16MB of RAM; active-matrix super-VGA screen

CONS: One-year warranty, unknown track record for service and reliability

6 Sharp PC 3020

LAST REVIEWED: June 1996

PROS: Inexpensive, built-in sound and fax-modem, good battery life

CONS: Sluggish for a Cyrix 5x86-100 notebook

7 AST Ascentia 950N

LAST REVIEWED: May 1996

PROS: Big hard drive, active-matrix screen, built-in sound, 5-hour battery life

CONS: Pricey for a P-75 budget notebook

8 ZDS Z-Note MX

NEW THIS MONTH

PROS: Good design, fast P-75 performance for just 8MB

CONS: Short 2-hour battery life

ZDS

This $2199 notebook doesn't have any fancy features, but it does cram what you need for running business applications into a neat, sturdy package. Backed by 8MB of RAM, this P-75 earns a PC WorldBench score of 91. Its 540MB hard drive is adequate, and the 10.4-inch dual-scan screen is easy on the eyes.

As we went to press, we learned that this notebook will soon be discontinued. So if you're interested, act fast.

9 WinBook XP5 P75

LAST REVIEWED: June 1996

PROS: Fast, good keyboard, active-matrix display, built-in 14.4-kbps fax-modem

CONS: Below-average score for system reliability, one-year warranty

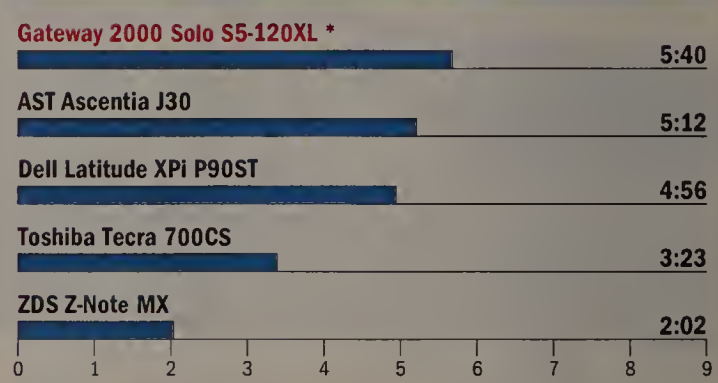
10 MPC TouchNote 1000

EDITOR'S NOTE: At press time, MPC Technologies was ceasing operations.

PROS: Inexpensive, good battery life, built-in sound and speakers

CONS: Sluggish P-75 performance, mediocre touchpad

TEST REPORT Battery Life



* Best Buy

Time in hours:minutes.

Methodology
We drain and fully recharge the battery twice and set power-saving options to match a consistent profile where possible. Office workers use Windows 95 applications, periodically saving and allowing regular idle time. Notebooks are rotated among workers. We report the time elapsed when the notebook shuts itself off.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

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Desktop Snapshots

These systems were tested along with the others but didn't score high enough to reach the Top 20 charts.

AST Advantage 626

PROS: Good home configuration with 16MB of RAM, 1.2GB hard drive, full multimedia

CONS: Very slow for a Pentium-133

Like most home PCs we test for the Top 20, this $2399 Pentium-133 desktop is long on style but short on speed. There's great documentation and an attractive software bundle that includes Lotus SmartSuite, but the system itself is lacking. It offers little room for expansion, and its PC WorldBench score of 156 is among the lowest P-133 marks we've seen. Half the Pentium-100s we've tested are faster, and almost all cost less. *AST Computers, 800/876-4278* **Reader service no. 802**

First Computer FCS P5-150

PROS: Inexpensive; 17-inch monitor; Matrox graphics card

CONS: Low-grade mouse, no modem

First Computer Systems' $2499 Pentium-150 nearly claims slots on both the Power and Budget Top 20 charts. It's loaded with 16MB of RAM, 512K of pipeline-burst cache, a 2GB hard drive, and a 6X CD-ROM drive. Even its 189 PC WorldBench score says power. Documentation is weak, though, and the keyboard and mouse seem cheap. *First Computer Systems, 800/325-1911* **Reader service no. 803**

MidWest Micro P5-133 Home PC

PROS: Good price, loaded with features, well designed

CONS: Low reliability and service scores

There's nothing wrong with the features of this $2699 Pentium-133 minitower. It's got 16MB of EDO RAM, a 1280MB hard drive, a six-speed CD-ROM drive, a 14.4-kbps fax-modem with voice mail, and a strong bundle of home software, including Microsoft Works, Encarta, Money, and Golf. Its PC WorldBench score of 188 is above average for its class, too. Unfortunately, MidWest Micro gets low marks for both system reliability and service in our fax-back survey. *MidWest Micro, 800/871-9128* **Reader service no. 804**

NEC Ready 9619

PROS: 6X CD-ROM drive, speakers, 28.8-kbps fax-modem, large software bundle

CONS: Slow for a P-166; dull-looking monitor

The $2899 NEC Ready 9619 is a moderately priced family system. It's loaded with features, but its PC WorldBench score of 159 is remarkably low for a P-166—lower than the scores of similarly configured P-100 PCs costing hundreds of dollars less. No excuses either: The system has 16MB of EDO RAM and 256K of pipeline-burst cache. Bundled software includes Microsoft Works and Encarta. *NEC Technologies, 800/388-8888* **Reader service no. 805**

FEATURES COMPARISON This Month's Contenders–Desktops

● = Yes ○ = No

n/a = not applicable

	Acma zPower 100	Cyrix 6x86-P166+ PC
Standard features		
Street price as of 5/4/96 [1]	$2095	$4639
CPU	Pentium-100	Cyrix 6x86-P166+
ZIF/overdrive socket	●/○	●/○
BIOS	AMI v1.00.04 11/10/95	Phoenix v4.04 Plug and Play 2/29/96
Installed/maximum RAM (MB)	8/128	16/128
SIMM sockets/number free	4/2	4/2
Secondary RAM cache installed/ maximum (K)	256/512	256/256
Case style	minitower	minitower
Free externally accessible 3½-inch/5¼-inch drive bays	0/2	0/1
Free internal 3½-inch/5¼-inch drive bays	1/0	0/0
Free 16-bit ISA expansion slots	1 [2]	2 [2]
Free 32-bit PCI expansion slots	3 [2]	2 [2]
Hard disk	Quantum Fireball	Seagate Barracuda
Size (MB)	1280	4000
Adapter	integrated EIDE	SCSI
Graphics adapter	Diamond Stealth64 Video 2201	Matrox MGA Millennium
Installed memory (MB)/type	2/EDO DRAM	2/WRAM
Monitor	Impression 5	CTX 1765GMe
Tube/viewable diagonal (inches)	15/13.9	17/16
Dot pitch (mm)	.28	.27
Modem speed for fax/data (kilobits per second)	14.4/28.8	14.4/28.8
Sound board	integrated Vibra 16	SB AWE32
CD-ROM drive	Toshiba XM 5302B	Mitsumi CRMC-FX600S
Speed	4X	6X
Parallel/serial/mouse/SCSI ports	1/2/0/0	1/2/1/1
Service and support		
Warranty for parts/labor (years)	3/1	3/3
30-day money-back guarantee	● [4]	●
On-site service first-year price	free	free
Repair turnaround policy (days at service center)	3	1
Daily toll-free phone support (hours)	9.5	24
Weekend support	○	●
Online support sites	BBS, WWW	BBS, WWW
Automated fax support	○	●

BEST BUY

[1] All systems priced as configured with Windows 95, VGA and color monitor, keyboard, and mouse or other pointing device. Price is direct or based on vendor estimate.

NMC Expert 166

PROS: Good performance for the money, loaded with extras, nice 17-inch monitor, 28.8-kbps fax-modem

CONS: Video and sound controller share an add-in card

The $2499 NMC Expert 166 is fast, with a PC WorldBench score of 197. This Pentium-166 system is loaded with 16MB of EDO RAM, a 2.1GB Seagate hard drive, a 6X CD-ROM drive, a U.S. Robotics V.34 fax-modem, and a 17-inch CTX monitor. The video card is a disappointment, but on the plus side, it comes with 2MB of DRAM. Oddly, the video controller and the sound controller are both situated on the same add-in card, so you can't easily upgrade one without upgrading the other. *National Microcomputers, 800/800-4662* **Reader service no. 806**

Swan PowerHouse P-150

PROS: Low price, lots of expansion room, sturdily built, feature rich, 6X CD-ROM drive, wavetable sound

CONS: Slowest P-150 we've tested, short support hours

	Dell Dimension P100t	Dell Dimension XPS P133c	Diamond OfficeMate P5120	HP Vectra 500 Model 515MCx 5/166	Maximus Magna Media P-166	Micro Express MicroFlex-686/ P120+	Robotech Cobra XLT P-133	Sys Technology Performance C166+
	$1879	$3299	$1645	$3345	$2499	$1899	$2199	$2599
	Pentium-100	Pentium-133	Pentium-120	Pentium-166	Pentium-166	Cyrix 6x86-P120+	Pentium-133	Cyrix 6x86-P166+
	●/○	●/○	●/○	●/○	●/○	●/○	●/○	●/○
	AMI v1.00.03 10/27/95	AMI Rev A05 12/31/95	Award v4.50 8/28/95	Phoenix v4.05.8 11/14/95	AMI 7/15/95	Phoenix v4.04 Plug and Play 10/5/95	Award v4.50	IBM v3.27 1/29/96
	16/128	16/128	16/128	16/128	16/128	32/128	16/128	16/128
	4/3	4/2	4/2	6/4	6/4	4/0	4/2	4/2
	256/256	256/512	256/51	256/512	512/512	256/512	256/512	512/512
	desktop	desktop	minitower	minitower	minitower	minitower	minitower	minitower
	0/1	0/1	0/1	0/2	1/2	1/2	0/3	1/2
	1/0	1/0	0/0	1/0	2/0	1/0	3/0	1/0
	2 [2]	2 [2]	2 [2]	2	3 [2]	3	2 [2]	1
	4 [2]	3 [2]	3 [2]	2	3 [2]	2	3 [2]	2
	Quantum Fireball	Quantum Fireball	WD Caviar 31600	WD Caviar 31600	Seagate ST32140	Quantum Fireball	Quantum Fireball	Quantum Fireball
	1600	1080	1624	1624	2140	1280	1280	1280
	integrated EIDE	integrated EIDE	integrated EIDE	integrated EIDE	Integrated EIDE	integrated EIDE	Integrated EIDE	integrated EIDE
	integrated S3 Trio64	Number Nine Imagine128	Diamond Stealth64 Video 2201XL	integrated S3 Trio64	Matrox MGA Millennium	ATI Graphics Pro Turbo	Number Nine 9FX Motion331	Matrox MGA Millennium
	2/DRAM	4/VRAM	2/EDO DRAM	1/DRAM	2/WRAM	2/VRAM	2/EDO DRAM	2/WRAM
	Dell VS15X	Dell UltraScan 17LS	Amax Impression 5E	HP D2818S	MAG DX1595	KFC	Cobra 1728	MAG DX15T
	15/13.6	17/15.6	15/13.4	15/13.7	15/14	17/16	17/15.4	15/14
	.28	.28	.28	.28	.28	.28	.28	.25 [3]
	n/a	14.4/28.8	14.4/14.4	14.4/28.8	14.4/28.8	n/a	14.4/28.8	14.4/28.8
	Vibra 16	SB AWE32	n/a	SB 16	SB AWE32	ESS/1688F	SB 16	Acer SP/301
	Teac CD56E	Teac CD56E	Mitsumi CRMC-FX400D	Hitachi CDR-7730	Teac CD56E	Sony CDU77E	Mitsumi CRMC-FX600S	Teac CD56E
	6X	6X	4X	4X	6X	4X	6X	6X
	1/2/1/0	1/2/1/0	1/2/0/0	1/2/1/0	1/2/0/0	1/2/0/0	1/2/0/0	1/2/0/0
	3/3	3/3	1/1	1/1	1/lifetime	2/2	3/1	1/1
	●	●	●	○	●	●	●	○
	free	free	free	free	free	free	free	$95
	2	2	2	○	3	2	1	○
	24	24	9	16	9	9.5	9	○ [5]
	●	●	○	● [6]	● [6]	●	○	○
	AOL, BBS, CIS, Prodigy, WWW	AOL, BBS, CIS, Prodigy, WWW	BBS	AOL, BBS, CIS, WWW	BBS, MSN, WWW	WWW	BBS, WWW	○
	●	●	●	●	●	●	●	○

[2] One less 16-bit slot available when all PCI slots are filled, and vice versa. [3] Stripe pitch. [4] 45-day money-back guarantee. [5] 9 hours daily toll support. [6] Saturdays only.

The $2498 Swan PowerHouse P-150 tower has a loaded configuration, including a 1.6GB hard drive and a 6X CD-ROM drive, and it comes with six free drive bays and five free slots. This Pentium-150's PC WorldBench score of 181 is more like that of a P-133, but it's good for the price. While we don't have enough responses to our fax-back survey to score Swan's system reliability and service, early returns indicate the company does well. *Swan Technologies, 800/554-6748* **Reader service no. 807**

Sys Value Edition C166V+

PROS: Great performance at a low price, quad-speed CD-ROM drive, good monitor

CONS: Poor documentation, sparse support policies

This is the budget version of Sys's 20th-

FEATURES COMPARISON This Month's Contenders—Notebooks

● = Yes ○ = No

n/a = not applicable

Standard features	AST Ascentia J30	Dell Latitude Xpi P90ST	Gateway 2000 Solo S5-120XL	Toshiba Tecra 700CS	ZDS Z-Note MX
Street price as of 5/4/96 [1]	$3299	$3799	$5599	$4333	$2199
CPU	Pentium-100	Pentium-90	Pentium-120	Pentium-120	Pentium-75
Traveling weight (pounds) [2]	6.6	7.2	8.8	10.2	7.2
Width x depth x height (inches)	11.3 x 8.8 x 2	11 x 8.9 x 2.1	11.8 x 8.8 x 2	11.6 x 9.1 x 2.1	11 x 8.6 x 1.9
Installed/maximum RAM (MB)	8/40	16/40	40/40	8/40	8/40
Secondary RAM cache installed/maximum (K)	0/256	256/256	256/256	0/0	256/256
Installed/maximum hard disk (MB)	810/810	810/810	1358/1358	1200/1200	540/540
Removable hard disk	●	●	●	●	●
Screen type	color active	color active	color active	color dual-scan	color dual-scan
Viewable screen diagonal (inches)	10.4	10.4	10.4	11.3	10.4
Highest resolution of LCD	800 x 600	800 x 600	800 x 600	800 x 600	640 x 480
Maximum screen colors of LCD	65,536	65,536	256	256	65,536
Simultaneous LCD and external monitor	●	●	●	●	●
Mouse/keyboard ports	●/● [3]	●/● [3]	●/● [3]	●/●	●/● [3]
Cursor keys in inverted T	●	●	●	●	●
Dedicated page-control keys	●	●	●	●	●
All 12 function keys dedicated	●	●	●	●	●
Standard <Ctrl> and <Alt> layout	●	○	●	○	●
Built-in pointing device	eraserhead	trackball	touchpad	eraserhead	touchpad
CD-ROM speed	n/a	n/a	4X	4X	n/a
Built-in sound	●	○	●	●	○
Fax/data modem speed (kilobits per second)	14.4/14.4	n/a	28.8/14.4	n/a	n/a
Docking station available	●	●	○	●	●
PC Card slot Type II/III	2/1 [4]	2/1 [4]	2/1 [4]	2/1 [4]	2/1 [4]
Power management					
Type of battery	lithium ion	lithium ion	lithium ion	lithium ion	NiMH
Suspend button	●	●	●	●	●
Suspends when case closed	●	●	●	●	●
Service and support					
Warranty for parts/labor (years)	3/3	3/3	1/1	3/3	1/1
30-day money-back guarantee	○	●	●	○	●
On-site/replacement service first year price	n/a	free	free	$50	free
Repair turnaround policy (days at service center)	2	2	n/a	2 [5]	1
Daily toll-free phone support (hours)	24	24	24	24	24
Weekend support	●	●	●	●	●
Online support sites	AOL, BBS, CIS, Prodigy, WWW	AOL, BBS, CIS, WWW	AOL, BBS, CIS, Prodigy, WWW	BBS, CIS, MSN, WWW	BBS, CIS, WWW
Automated fax support	●	●	●	●	●

BEST BUY

[1] All notebooks priced as configured with Windows 95, color display, and mouse or other pointing device. Price is direct or based on vendor estimate.

[2] Includes computer, adapter, power cord, floppy drive, and CD-ROM drive if notebook has one.

[3] Mouse port doubles as keyboard port.

[4] Type III slot alternatively accepts two Type II devices.

[5] $50 per year for two-day turnaround.

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place Power Desktops PC. It's based on the 133-MHz Cyrix 6x86-P166+ chip. The video card is from ATI rather than Matrox, it has a 4X CD-ROM drive instead of a 6X, it lacks a modem, and its MAG 15-inch monitor, while no slouch, isn't the same MAG Trinitron model as in the power configuration. But with a PC WorldBench score of 203 and a $2239 price, it offers tremendous bang for your buck. Unfortunately, the company's track record for system reliability and service is still unknown. Tech support hours are few during the week and nonexistent on weekends. *Sys Technology, 800/613-9963* **Reader service no. 808**

USA Flex Family Special P-133

PROS: Good speaker system, 8X CD-ROM drive, 28.8-kbps fax-modem, lots of software

CONS: Mediocre P-133 performance, poor documentation

This $2399 USA Flex P-133 minitower nearly made the Budget Top 20. In addition to 16MB of RAM and a 1.2GB hard drive, it's loaded with good multimedia features, including a speaker system with subwoofer and a slew of SoftKey CD-ROMs. But the Family Special's speed is so-so for a P-133, and its documentation is disappointing. Also, consumer feedback indicates USA Flex has a shabby track record for system reliability and service. *USA Flex, 800/872-3539* **Reader service no. 822**

Xi Pro 200 MTower SP

PROS: Very fast, full multimedia, 4MB Matrox graphics card, enormous hard drive

CONS: Expensive for everyday Windows 95 use, noisy

With an impressive PC WorldBench score of 221, the Xi Pro 200 MTower SP is the fastest Windows 95 PC we've tested, but its $5699 price is steep. The high cost is primarily due to the Xi MTower's enormous 4.3GB wide–SCSI-2 hard drive and 32MB of RAM. The system is well built and highly expandable, though the mechanisms required to cool its Pentium Pro-200 processor make it a bit noisy. Until we receive some feedback about Xi from our fax-back survey, we can't evaluate its system reliability and service. Xi sells its computers with a three-year warranty on parts and labor. *Xi Computer, 800/432-0486* **Reader service no. 809**

Notebook Snapshots

These notebooks were tested along with the others but didn't score high enough to reach the Top 20 chart.

Canon InnovaBook 300P

PROS: Nice design, excellent screen, optional CD-ROM drive

CONS: Slow; quirky touchpad; short battery life

The $2299 InnovaBook 300P is well built, and its dual-scan screen approaches active-matrix quality. However, this is the slowest Pentium-75 notebook we've tested, and it runs for only about 2 hours on a single charge. In addition, we found the built-in touchpad overly sensitive and difficult to use. Canon backs its notebooks with a one-year warranty and offers toll-free technical support 18 hours a day, seven days a week. *Canon Computer Systems, 800/848-4123* **Reader service no. 810**

CTX EzBook 655CDT

PROS: Long battery life, nice screen, dual-speed CD-ROM drive

CONS: Second-slowest P-90 notebook we've tested

The $2799 CTX EzBook 655CDT looks boxy, but there's no arguing with its solid feel and fine components. The crisp active-matrix screen, the included CD-ROM drive, and the near–5-hour battery life are all pluses. However, the EzBook's PC WorldBench score of 92 is disappointing. Chalk up the relatively poor performance to just 8MB of RAM. CTX notebooks come with a two-year warranty and a 30-day money-back guarantee. The company offers toll-free tech support around the clock for the life of the system. *CTX Int'l, 800/888-9052* **Reader service no. 811**

Magitronic 550 Series

PROS: Infrared port, built-in sound, optional quad-speed CD-ROM drive

CONS: Short battery life, poor documentation

The $2889 Magitronic 550 Series notebook uses an AMD 5x86 CPU to achieve a PC WorldBench score of 177—roughly equivalent to that of a good Pentium-75 notebook. Magitronic took the cost savings from using the AMD processor and threw in 20MB of RAM, an active-matrix screen, and full multimedia. Otherwise, this is a very generic notebook, with a battery life of just 2.5 hours. Magitronic is a relatively new vendor to the Top 20, so we can't assess its reliability and service. Its standard warranty lasts two years. Tech support is free around the clock, but only for the first year. *Magitronic Technology, 770/849-0667* **Reader service no. 812**

Magitronic 600 Series

PROS: Good overall feel, crisp screen, multimedia features

CONS: Poor performance for a Pentium-90 notebook, short battery life despite new BIOS

Magitronic sent us a BIOS fix that was supposed to improve the battery life of this system. No such luck. The battery lasted less than 2 hours because power management wouldn't work under Windows 95. Moreover, the system's PC WorldBench score of 114 is very low for a Pentium-90 portable. To its credit, though, the Magitronic notebook comes with a 4X CD-ROM drive, built-in sound, and a bright 11.3-inch dual-scan super-VGA display. Overall it's a sturdy unit—one we've seen sold under other vendors' names. Unfortunately, the performance problems outweigh the good points. *Magitronic Technology, 770/849-0667* **Reader service no. 823**

Polywell Poly5133 NB8

PROS: Good price for a loaded configuration

CONS: Sluggish for a P-133 notebook, short battery life

At first glance, this $3784 notebook has everything you could want: 16MB of RAM, a 1.3GB hard drive, a removable dual-speed CD-ROM drive, an infrared port, and a 10.2-inch active-matrix display. However, because of a BIOS conflict with Windows 95, its battery life was under 2 hours in our tests. (Polywell is working on a fix that we will retest.) In addition, its PC WorldBench score of 140 was low for a Pentium-133 notebook. Polywell's standard warranty covers parts for three years and labor for five. *Polywell Computers, 800/999-1278* **Reader service no. 814**

Texas Instruments Extensa 560CD

PROS: CD-ROM drive standard, nice overall design

CONS: Slow for a P-75 notebook, subpar screen

Disappointing performance and a dull dual-scan screen tarnished our impression

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of the otherwise admirable TI Extensa 560CD. Overall, we liked the notebook's sleek design and comfortable, responsive keyboard. For $2599 you get good multimedia capabilities, including a quad-speed CD-ROM drive and 16-bit sound. The 8.2-pound traveling weight and 3-hour battery life are average for a multimedia notebook. Even the system's documentation is worthy of praise. Unfortunately, the Extensa's PC WorldBench score of 81 is low for a Pentium-75 notebook with 8MB of RAM. The standard warranty on the Extensa line lasts one year. You can extend coverage for $99 per additional year. Toll-free technical support is available 24 hours a day, seven days a week. *Texas Instruments, 800/848-3927* **Reader service no. 815**

TEST REPORT This Month's Contenders

Systems are arranged in order of overall performance from best to worst, based on the normalized, weighted scores from six tests.

Methodology We tested each system as supplied by the manufacturer. All tests are performed under Windows 95 configured with an HP LaserJet IV as the default. We disable any power-saving features. We set the video resolution to 800 by 600 in 256 colors, using the supplied video driver where possible. We load the test applications and files and the test automation software and scripts.

Word 7.0 for Windows 95 (25 percent of weighting)
We open multiple documents, format text, copy and paste, close files, scroll, and save files. We also change document views, insert text, check spelling, repaginate, count words, print preview, and mail merge.

Excel 7.0 for Windows 95 (20 percent)
Using a variety of worksheets including an automobile statistics sheet, a multisheet federal income tax workbook, a variable-rate mortgage worksheet, and an analysis of life insurance policies, we perform common functions and tasks including opening a file, formatting, data entry, sorting, recalculation, data query, print preview, printing, and saving the file.

Picture Publisher 6.0 for Windows 95 (15 percent)
Using an assortment of graphics, we perform functions including opening and saving files, zooming, scrolling, palette changes, posterization, image masking, hue shifting, feathering, and copying and pasting.

Paradox 5.0 for Windows (15 percent)
We simulate an order entry system. We import tables and post a series of orders, looking up customer and product data in the process. We perform a variety of queries, edit data, and create reports.

WordPerfect 6.1 for Windows (15 percent)
We open different-size files, search for text, change fonts, enter text, save files, and jump to a particular page. We also check spelling, copy and paste, scroll, change document views, and insert one file into another.

1-2-3 release 5 for Windows (10 percent)
Same functions as the Microsoft Excel test.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

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5 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
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How did you get this copy of *PC World*?
○ By subscription ○ On the newsstand ○ From someone else

ABOUT YOUR PC

Who is the manufacturer of the PC you use most frequently?

○ Acer ○ Acma ○ ALR ○ Apple ○ AST ○ AT&T (NCR) ○ Austin (IPC) ○ Axik ○ Blackship ○ Canon ○ Compaq ○ Compudyne
○ Computrend ○ Comtrade ○ CTX ○ Dell ○ Diamond ○ Digital (DEC) ○ DTK ○ EPS ○ Epson ○ Everex ○ Future Tech ○ Gateway 2000
○ Hewlett-Packard ○ HiQ ○ Hyundai ○ IBM ○ Insight ○ Intelesys ○ Leading Edge ○ Micro Express ○ Micron ○ Midwest Micro ○ MIS ○ Nat'l Micro
○ NEC ○ Netis ○ Packard Bell ○ Panasonic ○ PerComp ○ Pionex ○ Polywell ○ Quantex ○ Robotech ○ Samsung ○ Sharp ○ Swan
○ Tangent ○ Texas Instruments ○ Toshiba ○ Twinhead ○ USA Flex ○ Vektron ○ VTech (Expotech, Laser) ○ WinBook ○ Zenith (ZDS) ○ Zenon ○ Zeos ○ Other

What size is this PC?
○ Desktop
○ Notebook/laptop
○ Handheld

What is the CPU?
○ PowerPC
○ Pentium
○ 80486
○ 80386
○ Other

Where did you buy this PC?
○ Local dealer
○ Mail/phone order
○ Direct from field sales force
○ Membership discount store
○ Computer superstore
○ Home electronics store
○ Retail store
○ Value-added reseller
○ Other

After ordering, how long did it take to get your PC?
○ Less than 1 week
○ 1–2 weeks
○ 3–4 weeks
○ More than 4 weeks

Who set up your PC?
○ Dealer/retailer/VAR
○ Staff computer technician
○ Self or coworker

Where do you use this PC? ○ At home/home office ○ At work ○ Both

WHEN YOU FIRST GOT YOUR PC

When did you buy this PC? (Specify month and year.)

○ Jan ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec
○ 91 ○ 92 ○ 93 ○ 94 ○ 95 ○ 96

When you first set up your PC, were any components "dead on arrival" (DOA)?
○ Yes ○ No ○ Don't know

If so, which component was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive
○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory
○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse
○ Power supply ○ Sound board ○ Other

Did your problem occur only after you added your own hardware or software?
○ Yes ○ No ○ Don't know

Would you buy this brand of PC again?
○ Yes ○ No ○ Not sure

How many times have you had a problem with this PC?
○ No problem ever ○ One ○ Two ○ Three ○ Four ○ More than four

If you have had a problem that you have not reported in a previous survey, please fill out the right column. If you are reporting a DOA for the first time, skip to the service section.

NEW PROBLEM REPORT

Please answer for the most recent problem—*other than DOA*—not reported in a previous survey.

When did this problem occur? (Specify month and year.)

○ Jan ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec
○ 91 ○ 92 ○ 93 ○ 94 ○ 95 ○ 96

How long was this after you purchased your PC?
○ Less than 1 month ○ 1–3 months ○ 4–6 months ○ 7–12 months ○ More than 12 months ○ Not sure

Did the problem occur as a result of adding new hardware or software?
○ Yes ○ No ○ Don't know

Did the problem occur under warranty?
○ Yes ○ No ○ Don't know

What was the problem finally identified as? (Mark all that apply.)
○ Faulty component ○ Incorrectly installed software ○ Wrong configuration ○ Faulty peripheral ○ Device conflicts ○ OS problem ○ Other ○ Don't know

If a component failed, which one was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive
○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory
○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse
○ Power supply ○ Sound board ○ Other

SERVICE

Please use this section to describe the service and support you received for the problem reported above or the DOA reported at left.

Who fixed your PC?
○ Manufacturer
○ Dealer/store where purchased
○ Manufacturer's authorized repair technician
○ Self ○ Other

What types of service and support did you receive? (Mark all that apply.)
○ Phone ○ On site ○ In store ○ System swap ○ Component swap ○ Factory return

If you received phone service, how long were you on hold?
○ Not at all ○ Less than 1 minute ○ 1–2 minutes ○ 3–5 minutes ○ 6–10 minutes ○ 11–20 minutes ○ More than 20 minutes

How long did it take before you talked to the person who finally helped you?
○ Less than 15 minutes ○ 15 minutes–1 hour ○ 2–5 hours ○ 6–10 hours ○ 11–24 hours ○ 1½–2 days ○ 3–5 days ○ 1 week or more

How long did it take to resolve the problem completely?
○ 1–2 days ○ 3–7 days ○ 8–14 days ○ 15–30 days ○ More than 1 month ○ Never resolved ○ Awaiting resolution

Was the problem resolved to your satisfaction?
○ Yes ○ No

How would you rate the person(s) who helped you?

	Poor		Good		Excellent
Courtesy	○	○	○	○	○
Knowledge	○	○	○	○	○
Follow-through	○	○	○	○	○

Based on the service and support you received, would you buy this brand of PC again?
○ Yes ○ No

On the whole, how satisfied are you with the service and support you received?
○ Not at all ○ ○ Satisfied ○ ○ Extremely satisfied

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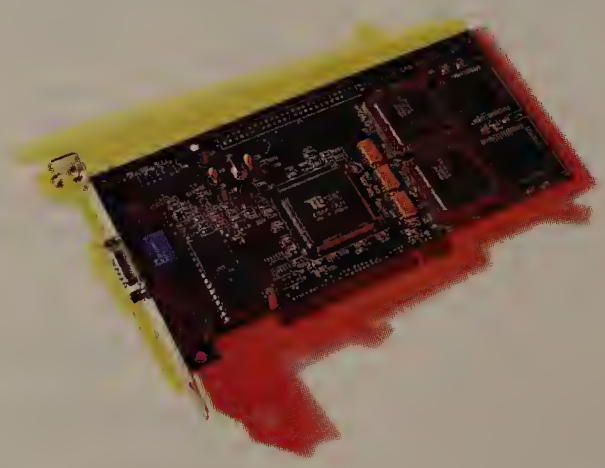
Q: What happens when you combine 128-bit video technology and the fastest memory chip?

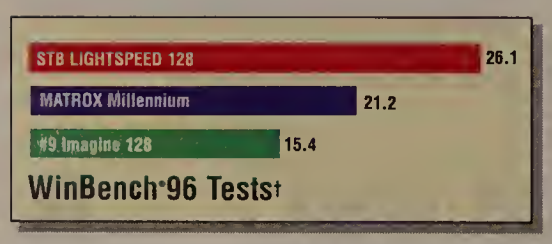
Tseng Labs ET6000, 128-Bit Graphics Accelerator
(Ideal for displaying multiple video windows)

MoSys Multibank MDRAM - 800 MB/sec.Transfer Rate
(Ideal for obliterating any graphics bottleneck)

A:



LIGHTSPEED 128 - Suggested Retail $249
(The fastest 128-bit video card at any price)



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Copyright 1996 STB Systems, Inc. All Rights Reserved. All trade names referenced are the trademarks, service marks, or registered trademarks of their respective holders. For a copy of the terms of the limited lifetime warranty contact STB at (214)234-8750. †WinBench 96 1.0 conducted on an Gateway 2000 (model P5-166,w/Windows95) 166MHz Pentium, PCI 2.0 Bus, 512KB Pipeline cache, 16MB EDO DRAM, Caviar IDE HD, 800x600 with 16.7 million colors at 75 Hz refresh. Competitor's boards were configured with 2MB memory STB LIGHTSPEED 128™, Matrox Millennium, and Number Nine Imagine 128 were run using driver versions 1.21, 2.30 and 2.09 respectively. Prices and specifications subject to change without notice.

VisionMaster Pro: Newcomer Takes Top Spot

Near-Perfect Vision
Superb graphics detail, readable text, and a full suite of advanced controls earn the Iiyama VisionMaster Pro 17 our top Best Buy.

In an ideal world, all monitors would display text and graphics perfectly. The fact is that some models are good for graphics, while others are better with text. We seldom see a monitor that excels at both. An exception: Our new number one Best Buy, the $865 Iiyama VisionMaster Pro 17. Of the five new monitors that earn a spot on our chart this month, this 17-inch Iiyama monitor makes words and pictures look their sharpest. On-screen menu controls are extensive yet easy to use. For example, if the picture geometry is distorted or if you see moiré patterns, the monitor's three-button control panel lets you navigate through a menu of 18 on-screen controls. Thermometer-style bars help you fine-tune settings that are saved in the monitor's memory. You can save up to 19 settings.

Although color graphics are not as true-to-life as on the Iiyama, text looks just as crisp on our new number two Best Buy, the $749 Samsung SyncMaster 17GLi. Samsung's monitor costs $116 less than the Iiyama, yet it has an equally robust array of controls that are a bit easier to adjust. The exact adjustment level appears on screen at the touch of a button, so there is no need to search through menus.

To make room for our two new Best Buys, March's top-ranking 17-inch monitor, the EIZO Nanao FlexScan F2-17 (recently known only as Nanao), slips to third. It's followed by the ViewSonic Optiquest V775—a good deal at $699. In our tests, text was easy to read on the V775's screen, and our test image of glazed fruit had better than average detail, albeit not the best. CAD users and desktop publishers will appreciate ViewSonic's full suite of advanced controls that let you fix image geometry or correct

TOP 10
17-INCH MONITORS

		Last ranking	First reviewed	Street price	Overall rating	Text quality rating	Graphics quality rating	Features, ease-of-use rating	Viewable screen diagonal (inches)	Max. refresh rate at 800 X 600 (Hz)	Reader service number	Comments
1	Iiyama VisionMaster Pro 17 800/394-4335	–	current	$865	85	85	83	77	15.90	120	621	Superb text and graphics, Level 2b Plug and Play[1], sharp 0.25mm stripe pitch.
2	Samsung SyncMaster 17GLi 800/933-4110	–	current	$749	85	83	71	73	15.63	104	622	Excellent text detail, extensive and intuitive on-screen menus, Level 2b PnP.
3	EIZO Nanao FlexScan F2-17 800/800-5202	1	Nov 95	$970	85	81	71	83	15.71	110	623	Great text detail, Level 2b PnP, easy on-screen controls, screen adjustment software.
4	ViewSonic Optiquest V775 800/888-8583	–	current	$699	84	80	71	62	15.90	120	624	Good price, very good text display, fast refresh, Level 2b PnP, 0.26mm dot pitch.
5	NEC MultiSync XV17+ 800/632-4636	–	current	$849	84	80	72	73	15.45	75	625	Very good text, Level 2b PnP, screen adjustment software.
6	Princeton Graphic Ultra 17+ 800/747-6249 ext. 182	–	current	$649	83	73	78	67	15.80	120	626	Lowest price on chart, fast refresh, Level 2b PnP, very good graphics, easy to adjust.
7	Mitsubishi Diamond Pro 17TX 800/843-2515	3	Nov 95	$1073	83	76	72	85	15.89	120	627	Level 2b PnP, fast refresh, screen adjustment software, 0.25mm stripe pitch; pricey.
8	MAG InnoVision MXP17F 800/827-3998 ext. 163	4	Nov 95	$950	82	76	85	67	15.97	120	628	Excellent graphics, fast refresh, 0.26mm dot pitch; no PnP or on-screen controls.
9	ViewSonic 17PS 800/888-8583	5	Nov 95	$995	82	72	77	76	15.71	128	629	Very good graphics, Level 2b PnP, high refresh, 0.25mm dot pitch; pricey.
10	Nokia Valuegraph 447L 800/296-6542	8	Nov 95	$695	81	62	82	60	15.70	85	630	Good price, excellent graphics, 0.26mm dot pitch; okay text, no PnP or on-screen controls.

[1] Level 1 Plug and Play sends monitor settings to graphics card; Level 2b adds a bidirectional capability between graphics card and monitor.

BEST BUY

Methodology We tested the monitors at a resolution of 800 by 600, set at 65,536 colors and a vertical refresh rate of 72 Hz. We used a Pentium-90 PC with 16MB of RAM and a Diamond Stealth 64 PCI graphics card with 2MB of DRAM. The overall rating includes ratings for display quality (50 percent), features (25 percent), price (20 percent), and service and support (5 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

For more information about all products in this table, circle reader service no. 903.

Sharp Words
Small type is easy to read across the screen on Samsung's $749 SyncMaster 17GLi. If you're looking for an affordable 17-inch monitor that's easy on your eyes and doesn't skimp on features, check out the 17GLi.

separate color values. ViewSonic's one-button control menu and thumbwheel dial scheme is odd, but it works. You press the button to activate the menu, turn the dial to select the menu item you want, then click the button again and adjust with the dial. The visual feedback and logical feel of the menus allow precise adjustments. Adjusting contrast and brightness, however, requires three clicks rather than one simple step.

In fifth place, the NEC MultiSync XV17+ replaces the older MultiSync XV17 model that held second place in March. Text looks great on both monitors, but we were a little less wowed by graphics quality on this newer model. At $849, the XV17+ costs $50 more than the older model, but it has on-screen menus and Level 2b Plug and Play support. Our judges liked how its menus avoid jargon and use animated icons to demonstrate how each control works. For example, the pincushion control is called In/Out and an icon for it bows in and out along the edges so you quickly get the idea. For contrast and brightness, NEC still uses old-fashioned dials, so everyday adjustments are quick.

At an affordable $649, Princeton Graphic's Ultra 17+ lands in sixth place. Our test images of fruit and skin tones looked very good, and above-average text detail made reading easy. Fancy controls? The 14 buttons on this monitor look a bit overwhelming, but they get the job done easily. No need to decipher cryptic icons or hunt through menus; just tap a button and the appropriate adjustment gauge appears.

Seen But Not Forgotten

Three other monitors we tested fell just short of our Top 10. Sony's $999 Multiscan 17sfII does a great job of displaying text, but for this price we expected to see more advanced controls—such as trapezoid and barrel correction. How does the 17sfII compare to its 17sf predecessor we reviewed last November? The 17sfII model is Plug and Play ready, sports a flatter tube that reduces screen glare, and now includes intuitive on-screen menu controls. Finally, Sampo's AlphaScan 17mx ($620) and 17gx ($729) are both reasonably priced and offer high refresh rates and a good set of basic controls, but mediocre text and graphics scores hamstring their Top 10 chances.

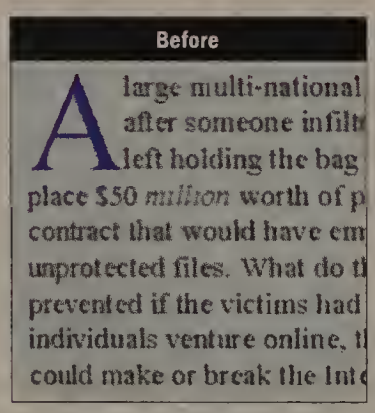
—John Goddard

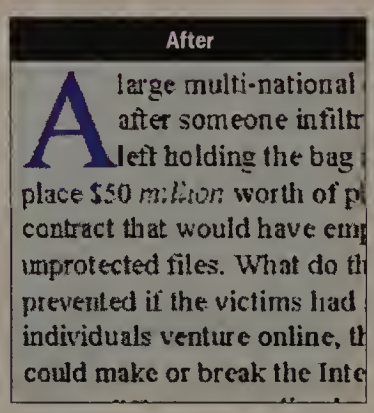
MONITOR BASICS: Tips and Terms

Whether you're shopping for a new monitor or want to stick it out with the one you've got, here's a quick list of things that will improve your image.

Refresh rate Did you know that when you read from a screen your eyes blink only a quarter of the time they normally do? Because of this, eyeballing a display all day can really take its toll. For comfortable viewing, your monitor should be set to refresh the screen at a rate of at least 72 Hz. If your eyes still smart at the end of the day, try speeding up the refresh rate to 85 Hz—if your graphics card can support it. Use your graphics card utility driver to change the refresh rate.

Geometry Each time a monitor is transported, the risk of distorting the picture shape increases. To improve your chances of fixing a skewed image, look for monitors with lots of geometric controls. If the picture is bowed on the edges, pincushion and barrel controls can straighten edges inward or out. A trapezoid control will fix a image that is too narrow or wide at the top or bottom, and a rotation tool can make the entire screen level again. Better monitors stash these advanced tools in submenus to avoid accidental changes, and have a reset button to use if you mess up.





Blurred letters and dull colors on your monitor? Lowering the contrast and brightness levels may improve the picture.

Focus and color Before you jump to the conclusion that your monitor is out of focus or the colors are dull, try fiddling with your contrast and brightness controls. By turning down these controls, you should see sharper text and richer colors.

On-screen menus Most new monitors now sport on-screen menus that you control using buttons below the screen. They offer greater precision than the traditional dial approach, but some complicate a simple task such as changing contrast or brightness. Before you buy, check how easy it is to make simple adjustments. The fewer buttons and menus you have to use, the better.

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Here's proof. As a result of PC World's rigorous Windows 95 tests on a slew of Systems, DTK QUIN series came out at the top once again. The QUIN series has received Best Buy and Top 20 Awards month after month in Power and Budget categories. Just check the back issues and see.

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What's more, PC World conducted a Reliability & Service survey (Dec. '95) with its readers, and found DTK to be a winner. Receiving a 'Four-star' rating, DTK was also mentioned to have "Minuscule system DOA rate and few unresolved problems."

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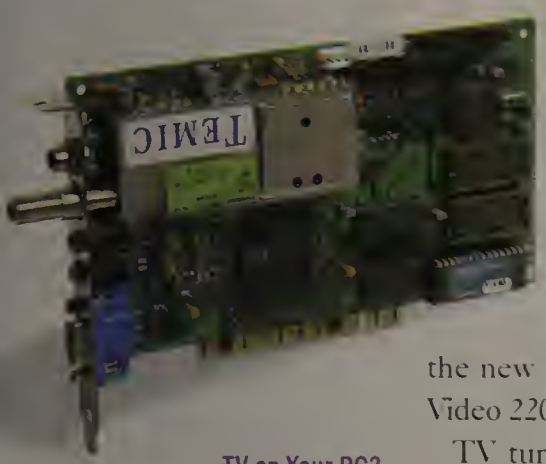

TV on Your PC? *The Diamond Stealth64 Video 2201TV puts the TV remote on your Windows desktop and delivers strong performance to boot.*

A computer is meant to increase your productivity. But these days you can kill as much time at your keyboard as you can on your couch. Two of the four new boards we tested this month work with TV tuners that let you plug an antenna or a cable hookup into the back of your system and watch television. Of the new boards, only the $269 Diamond Stealth64 Video 2201TV made the Top 10.

TV tuner add-in cards are nothing new, but the Stealth64 Video 2201TV is the first graphics board we've tested that has the tuner built in (see *New Products*, June). We got good reception, considering all the interference in the PC World Test Center. More important, the built-in tuner didn't affect the board's speed. That means you can use the Stealth64 Video 2201TV to monitor the stock market on CNN, for example, without slowing down your programs.

We also tested Connectware's $499 RasterMedia with its $149 tuner add-in card. The RasterMedia is a well-rounded multimedia board that also acts as a wavetable sound card. It did a good job of running both business applications and video. But at $499 it's hard to recommend unless you want to upgrade both your graphics and sound cards.

Two boards from Artist Graphics didn't make the chart either. The $350 Artist 2000 (with 2MB of VRAM) and the $890 Artist 2000i (with 4MB of VRAM) feature good software and documentation. They even have built-in 3-D functions. But they're expensive, they didn't do well in our tests, and neither one accelerates full-motion video.

—Brad Grimes

TOP 10 GRAPHICS BOARDS

		Last ranking	Last reviewed	Street price	Overall rating	PC WorldBench graphics score	AVI playback (frames per second)	MPEG video playback quality	Chip/Installed RAM (MB)/type	Reader service number	Comments
1	Matrox MGA Millennium 800/361-1408	1	June 96	$269	91	184	29	poor	MGA-2064W/ 2/WRAM	601	$60 price drop on fastest board we've tested; 3-D, DirectVideo support.
2	STB Powergraph 64 Video 800/234-4334	2	June 96	$209	87	175	10	good	S3 Trio64V+/ 2/EDO DRAM	602	Low cost; handles video well without DirectVideo; strong support.
3	Diamond Stealth64 Video 2201XL 800/468-5846	5	June 96	$197	87	176	9	excellent	S3 Trio64V+/ 2/EDO DRAM	603	New Win 95 software adds value; tech support is hard to reach.
4	Hercules Terminator 64/Video 800/532-0600	3	June 96	$179	86	172	8	good	S3 Trio64V+/ 2/EDO DRAM	604	Low cost; extensive utilities; performance is fine for everyday use.
5	Hercules Terminator Professional 800/532-0600	4	June 96	$279	84	178	10	good	S3 Vision968/ 2/VRAM	605	Good for graphics professionals (who might opt for an extra 2MB of VRAM)
6	Diamond Stealth64 Video 2201TV 800/468-5846	—	current	$269	82	175	9	excellent	S3 Trio64V+/ 2/EDO DRAM	606	Lets you watch TV on your PC without compromising graphics performance.
7	STB Velocity 64 Video 800/234-4334	6	June 96	$279	82	176	10	good	S3 Vision968/ 2/VRAM	607	Much like the Terminator Pro; good Win 95 software, strong support.
8	ATI Video Xpression 905/882-2600 ext. 1	9	June 96	$199	82	174	8	excellent	ATI-264VT/ 2/DRAM	608	Well built; slow at 1024 by 768; new TV tuner option ($99) boosts value.
9	Hercules Stingray 64/Video 800/532-0600	7	June 96	$189	81	173	9	good	Ark2000PV/ 2/EDO DRAM	609	Inexpensive; DirectVideo available on Web; no high refresh rates.
10	Number Nine 9FX Motion771 800/438-6463	8	June 96	$279	81	177	10	poor	S3 Vision968/ 2/VRAM	610	Decent speed for VRAM board; good utilities, highest refresh rates.

BEST BUY

Methodology We tested boards with PC WorldBench 1.0 at 800 by 600 resolution at 16.8 million colors (reported here) and at 1024 by 768 at 65,536 colors. For a description of the PC WorldBench tests, see the Test Report in this month's system review. We tested AVI video playback at 800 by 600 at 16.8 million colors using Microsoft's Media Player and an MCI command string that reports dropped frames. The clip was compressed at 320 by 240 at 16.8 million colors using Indeo 4.1. We played the clip at its native resolution and at twice its native resolution. We rated MPEG playback quality at 2X using the software player bundled with each board and compared quality to that of a hardware MPEG playback card. The overall rating includes ratings for performance (40 percent), features (30 percent), price (20 percent), and support policies (10 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved

Windows 95–certified Plug and Play

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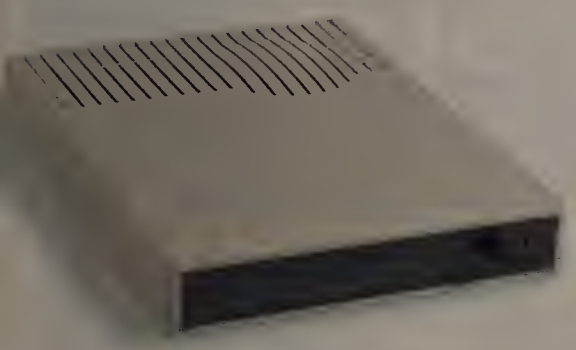
Circle 32 on reader service card

Megahertz XJack Changes Face, Stays in Place



THE PRICE IS NICER
With FlashROM and voice mail, Cardinal's MVP288XV is a lot of modem for $185, $24 less than last month.

Megahertz's latest PC Card modem, the XJ4288, premieres this month at number four, the same rank its XJ2288 predecessor held in June. Megahertz kept the exemplary features such as the internal XJack phone line connector and plain-English documentation, and added improved performance and cellular support.

Also on the PC Card list, a $15 price drop brings Microcom's TravelCard 28.8P up just enough to tie with the Zoom Telephonics V.34C Model 520, a Best Buy since March. And Hayes's Optima 288 now comes with toll-free tech support and security features, moving this already fine value to third place. The other PC Card modems we tested missed the chart by a wide margin. Eiger's EXF-2880P comes with no weekend or online support, and its manual is sparse. Digicom's Scout V.34 28.8 Fax Modem performed feebly and failed to install on our Windows 95 notebook.

The desktop chart is holding steady. The Microcom DeskPorte 28.8P again shares the Best Buy with the Motorola ISG Lifestyle 28.8. A price drop from $209 to $185 keeps the feature-rich Cardinal Technologies MVP288XV on the chart, despite competition from the new Zoom Telephonics V.34X External Fax/Data Modem. The V.34X has a limited features set but performs well and is only $169. The other new desktop modems we tested didn't fare as well. Logicode's Quicktel 2814XV has high connect rates but isn't Plug and Play compatible. Practical Peripherals' PC288MT has low connect rates. And the Amquest AM2814E Hypermodem's paltry feature set and poor documentation kept it well off the chart.

—Eric Hellweg and Bryan Hastings

TOP 10 MODEMS

		Last ranking	First reviewed	Street price external/internal (ISA)	Overall rating	Throughput rating	Connect rating	Features, ease-of-use rating	Reader service number	Comments
DESKTOP	1 Microcom DeskPorte 28.8P 800/822-8224	1	Apr 96	$215 / –	89	78	90	79	611	Great all-around modem. Serial port–only 28.8S model is a good alternative at $159.
DESKTOP	2 Motorola ISG Lifestyle 28.8 800/566-3266	2	Mar 96	$200 / $175	89	85	97	69	612	No special features, but nice price and toll-free support. Usually connects at 28.8 kbps.
DESKTOP	3 U.S. Robotics Sportster V.34 Faxmodem 800/342-5877	3	Nov 95	$219 / $199	88	83	90	78	613	Affordable, excellent performance, manual volume control.
DESKTOP	4 Microcom DeskPorte Fast V.34 800/822-8224	4	Nov 95	$391 / –	86	75	90	88	614	Not cheap, but very easy to use. Plain-language display, toll-free tech support.
DESKTOP	5 Cardinal Technologies MVP288XV 800/775-0899	5	May 96	$185 / –	86	75	82	78	615	Performance is so-so, but this feature-rich modem is $24 less than last month.
PC CARD	1 Zoom Telephonics V.34C Model 520 800/666-6191	1	Mar 96	$199	88	74	90	77	616	Best price and performance, but installation will likely require a support call.
PC CARD	2 Microcom TravelCard 28.8P 800/822-8224	2	Feb 96	$259	88	77	80	78	617	$15 price drop nudges this excellent performer to a Best Buy.
PC CARD	3 Hayes Optima 288 V.34+Fax for PCMCIA With EZjack 770/840-9200	5	Feb 96	$269	87	79	72	79	618	Low connect rate at 28.8, but new security features and toll-free support move it up the chart.
PC CARD	4 Megahertz XJ4288 800/527-8677	–	current	$300	87	75	76	86	619	Successor to XJ2288 features higher connect rate and cellular connectivity.
PC CARD	5 MultiTech MultiModem LT 800/328-9717	3	Apr 96	$249	86	68	87	74	620	Alluring price, and it installs flawlessly. It's fast, too.

BEST BUY

Methodology We tested each modem using a pair of identical units, one at each end of a simulated public-service telephone network. We tested throughput and connect rates using a variety of file types and line conditions. We tested PC Card installation on a Latitude XPi P75D provided by Dell. We used vendor-supplied initialization strings. The more expensive a modem, the more importance we give price in the unit's overall rating. The overall rating includes ratings for price (3 to 20 percent), features and ease of use (32 to 38 percent), performance (40 to 46 percent), and support (8 to 13 percent). Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

For more information about all products in this table, circle reader service no. 902.

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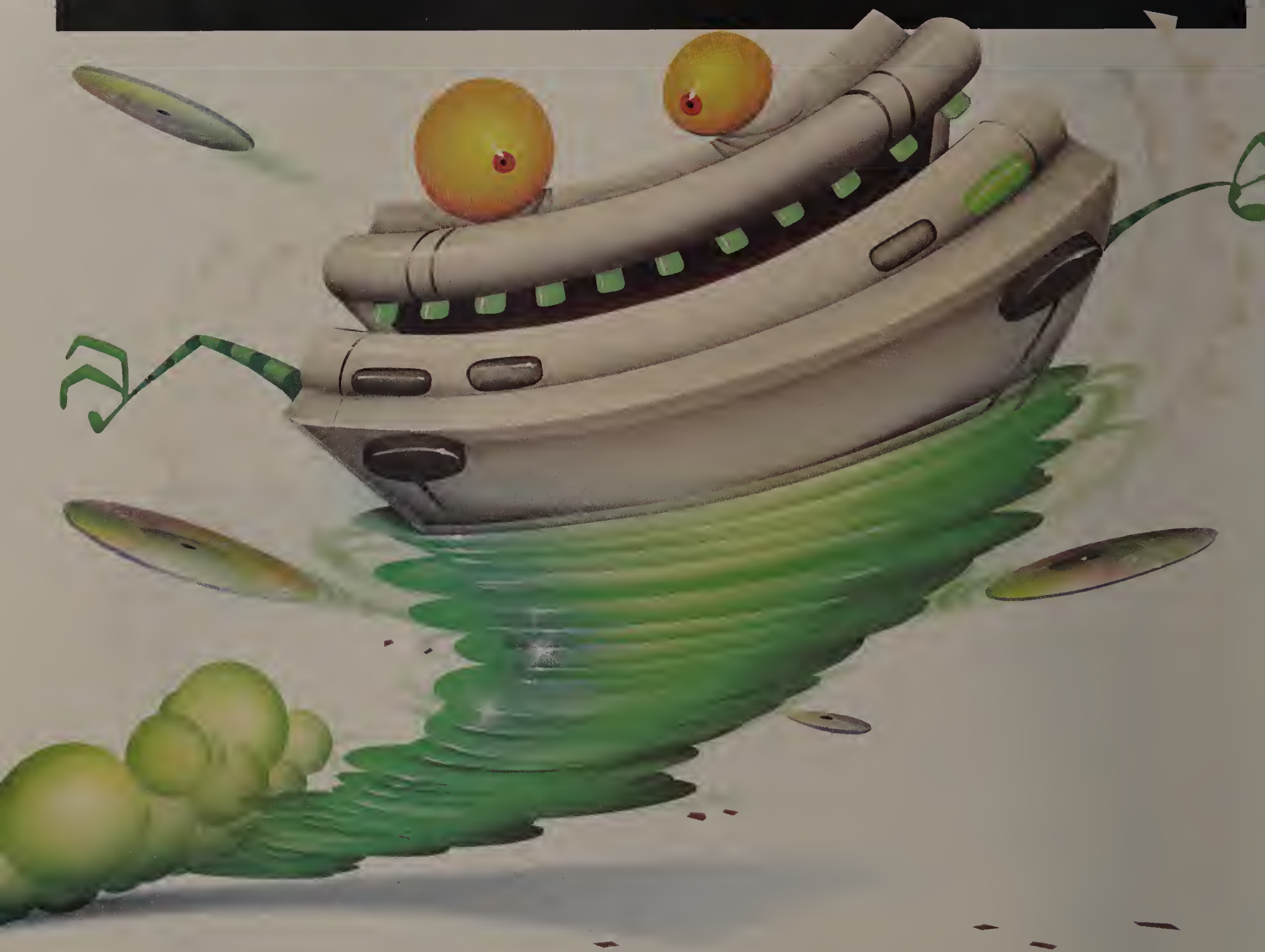

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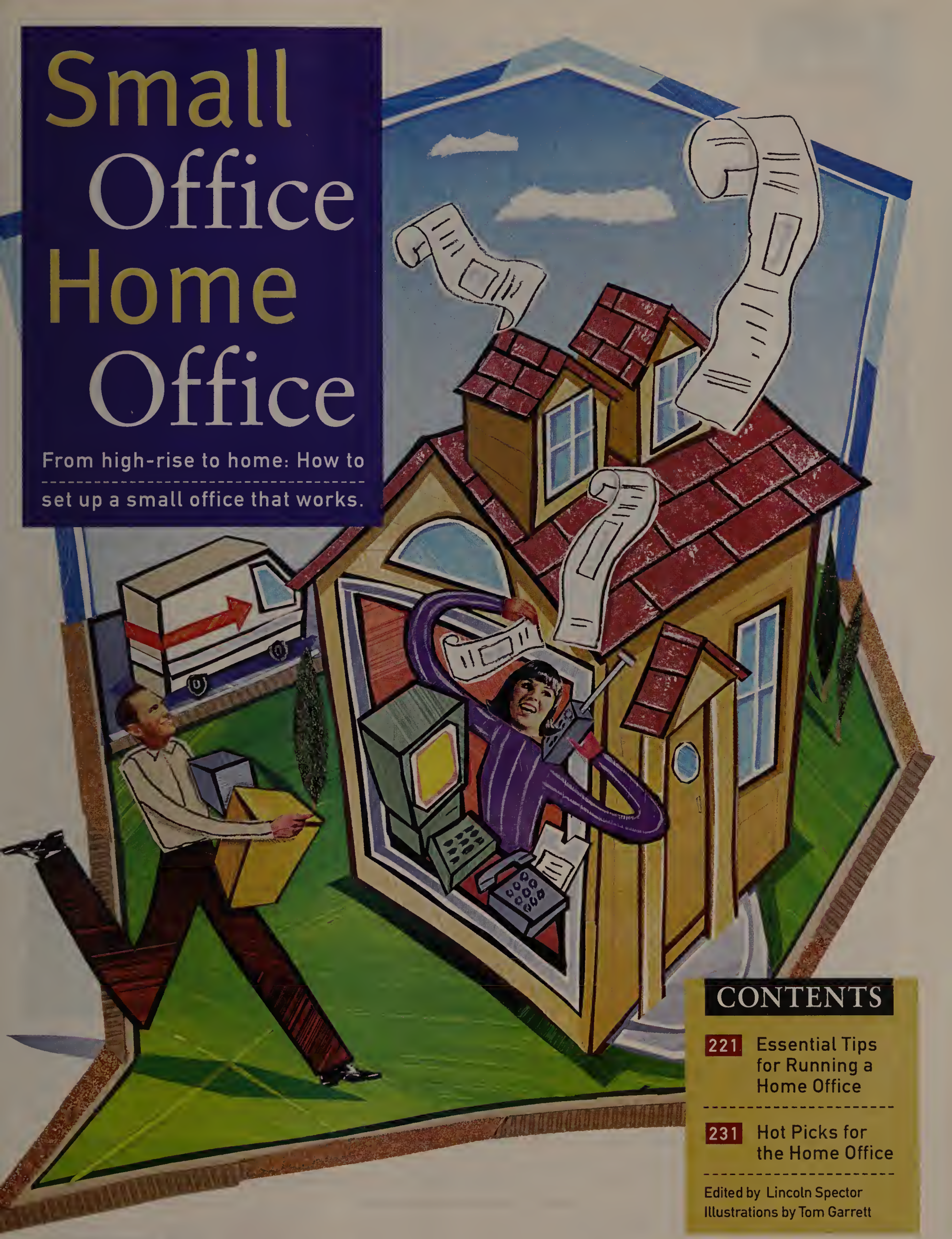
Small Office Home Office

From high-rise to home: How to set up a small office that works.



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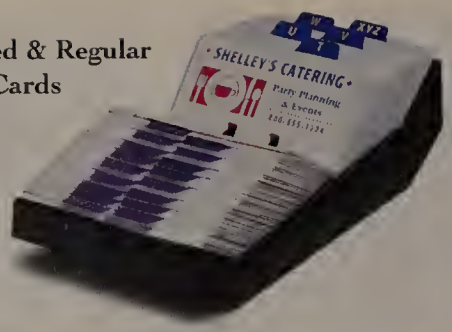
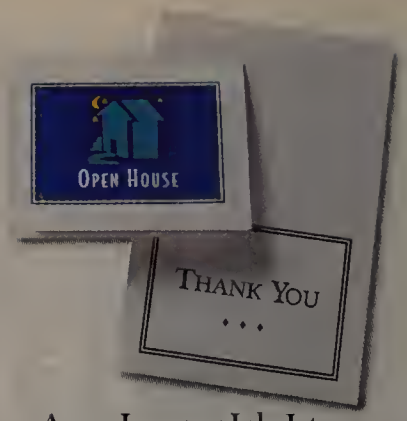
Avery Laminated & Regular
Rotary Cards





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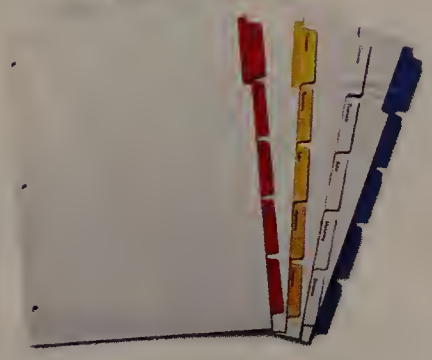

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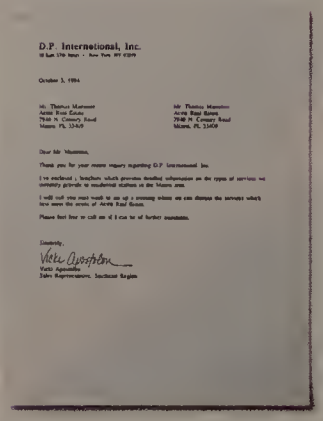

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Essential Tips for Running a Home Office

BY MICHAEL S. LASKY

No staff? No problem. Here's how to keep your office in shape.

The first day I started up my home office, I never felt more exhilarated. Or so completely alone.

You see, running an office is a lot harder than working in one. Suddenly you have no backup, no support staff, and hundreds of dilemmas: What's the best way to keep track of expenses and hours? How do you create the illusion that you have an office with a secretary and not a retrofitted garage with a telephone? Is there really a way to file papers so you can find them again quickly? How do you get insurance coverage for your computer equipment without going broke on the premiums?

Here are a few tricks I learned—many of them the hard way—for getting over these hurdles.

Make a Single Phone Your 'Switchboard'

How could I coax the sort of functionality out of my telephone and answering machine that I had learned to expect in an office with a switchboard, a receptionist, and a fancy voice-mail system? And how could I make my telephone and answering machine sound to my clients like a switchboard, a receptionist, and a fancy voice-mail system?

I found that the latest phone technology offers many ways to create that busy-office facade while giving my productivity a helpful boost. Voice-mail systems let you create multiple mailboxes—say, one for clients, another for subcontractors, and another for suppliers—giving you an instant handle on the messages you need to access first and making it sound as if you've got a large office. And the call forwarding means important calls will get to you when you're away.

TIP Use call forwarding. For about $5 extra a month, your local phone company will let you forward your incoming calls to another number. It could be to your current job site, to a homebound person who can field your calls, or to a telemarketing center that specializes in answering customer queries.

TIP Get a better answering machine. Tapeless digital answering equipment has become both versatile and affordable. For example, the $169 Bogen Friday Communications Manager gives you seven announcements—four of which the caller can respond to—and call forwarding that bypasses your phone company. And you can even attach it to a radio to play hold music.

If you need to cut desktop clutter, consider buying a phone with voice messaging built-in. For $180, Lucent

I commute from Seattle to Boston in seconds.

I got an offer to run a satellite sales office.

But there was a catch — a 3,000 mile catch.

I couldn't bear the thought of leaving home.

Fortunately, my company liked the idea of telecommuting. And that's when I got my Acer® Aspire™ 2550 Minitower. It takes me from home to headquarters in seconds. It has online software and a powerful fax modem that lets me e-mail my executive summaries to corporate on time. Plus, a large hard drive, a high-speed CD-ROM drive and stereo speakers that really jazz up my multimedia presentations.

And because my Aspire 2550 Minitower has an Intel® Pentium® processor, I have just as much computing power as my colleagues at the office.

Now I can have my latté at work just the way I like it—while working from home.

Aspire. To Do More.

A few more things I can Aspire to do:

Order dinner from a local restaurant.

Negotiate contracts online.

Manage my company stock options.

Keep up with my business journals.

Comparison shop for designer clothes.

And cruise the Internet.

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Technologies sells the Digital Answering System Speakerphone, a telephone with messaging features similar to the Bogen Friday's (but without the hold music). Callers can leave messages in up to four different mailboxes, each with its own announcement. And it can automatically dial the forwarding number you've specified, without telling the caller.

Another way to clear your desk of single-function gizmos and get phone, voice mail, and fax is to buy Connectware's $299 PhoneWorks 28.8, an add-on board for PCs that integrates a full-duplex speakerphone, comprehensive fax features, and a voice messaging system. The card features Caller ID support functions as well as paging to specified phone numbers. You can make your calls on the included boom microphone or with your regular phone. PhoneWorks connects easily to an existing sound card and speakers.

And because these systems don't use tape, you can randomly access your messages and selectively save and delete them.

TIP Caller ID service lets you know who's calling *before* you answer. Now available nationally, Caller ID shows the phone number of incoming calls on either the phone or a special Caller ID add-on unit. When combined with the right software, Caller ID can automatically route calls from particular phone numbers to appropriate voice mailboxes or prerecorded messages. With a full-duplex modem or sound card and the right software, it can even pull up a client record (if the incoming call is from a phone previously logged) on your computer screen before you pick up the phone.

Algo Communications' $89.95 PC Phone Manager (for Windows 3.1 and 95) integrates Caller ID with various contact managers and personal information managers, such as Act, Lotus Organizer, and Sidekick, automatically opening your PIM to the appropriate name when the phone rings. Any information you have on the caller will pop up, helping you decide between answering the call or leaving it to voice mail. Combined with call forwarding, the product lets you selectively send incoming calls to another number. And the PC Phone Manager also logs incoming and outgoing calls—useful for charging phone expenses to a client's bill.

Although numerous Caller ID phones and add-on boxes are available, some standout products truly exploit the feature. For example, Northern Telecom offers the Meridian 9516, a combination Caller ID phone and tapeless digital answering machine that costs less than $300 and actually announces who is calling, thanks to its built-in synthesized voice and programmable database of names and numbers. It also keeps a record of calls (great for call auditing) and allows you to choose which of your waiting messages you want to hear first. You can create up to 75 personalized greetings for different callers identified by incoming phone number.

The right phone can take the place of an office switchboard and receptionist.

TIP Use a commercial answering service. If you need to be on call but don't want to hand out your pager number or can't divulge your off-site location, this is your best bet. When someone calls your number, they get a receptionist who takes the message and, if it's urgent, contacts you—all for as little as $60 a month. But be warned: Although answering services offer that needed human touch, they also can put off callers who want to leave a personal or detailed voice-mail message and would therefore prefer a machine. To help with this problem, some services now offer voice mail to callers.

I assumed my home office was covered through my renter's insurance, but I was wrong.

Making (Client) Tracks

Even with just a few clients, I found it difficult to log the hours I spent working for each and then tally and separate my individual expenses for each client. But there are ways.

TIP Use client tracking and billing software. My favorite is TimeWin 1.2.1, a $49.95 shareware package that gives you an interface similar to Windows 3.1's File Manager for viewing and assigning where you bill your time. You can separate your billable hours into different projects, letting the program generate an invoice with those project hour breakdowns. You'll find TimeWin as timewin.zip on PC World Online.

If you prefer retail packages, I'd recommend either Timeslips Personal Plus or Responsive Time Logger 2.0. Both offer robust, easy-to-master features tailored to a small office's need to track hours

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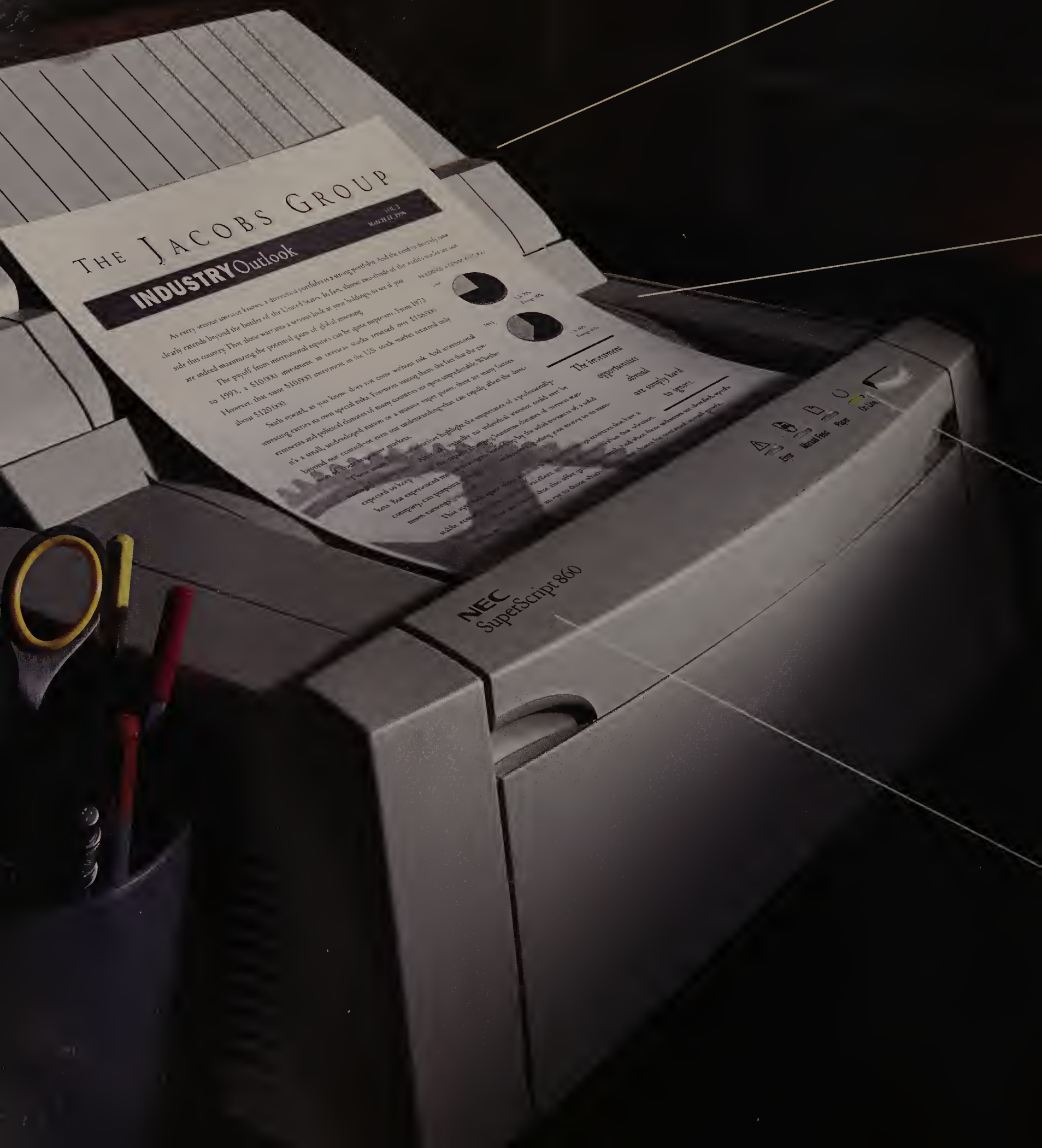

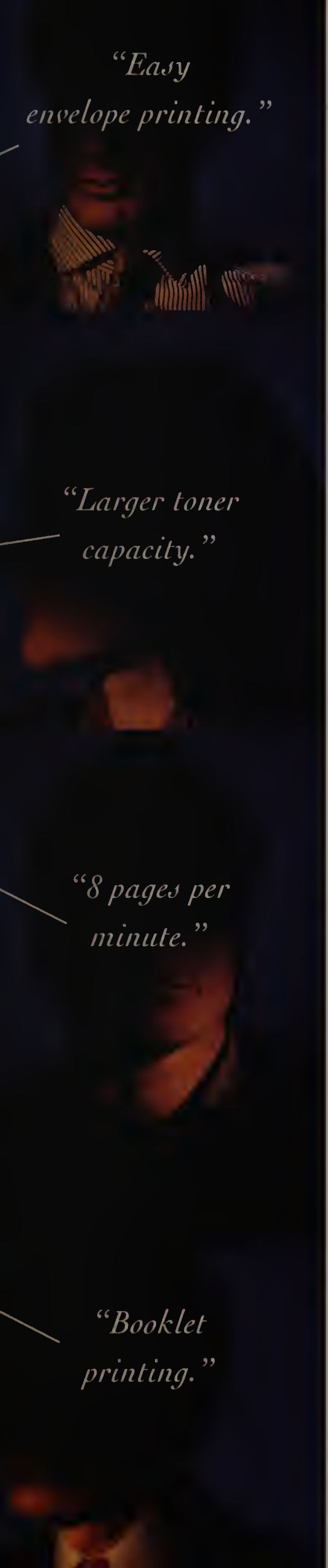

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Say you've got a proposal due the next day. No problem. The SuperScript 860 can quickly print everything from your transparencies to a special proof sheet that lets you lay out your entire proposal. We've even included our Solutions CD which helps you make all your documents look as professional as possible. Plus, the SuperScript 860 comes with an overnight replacement warranty† and it's the first printer ever to offer Adobe® PrintGear™ technology.

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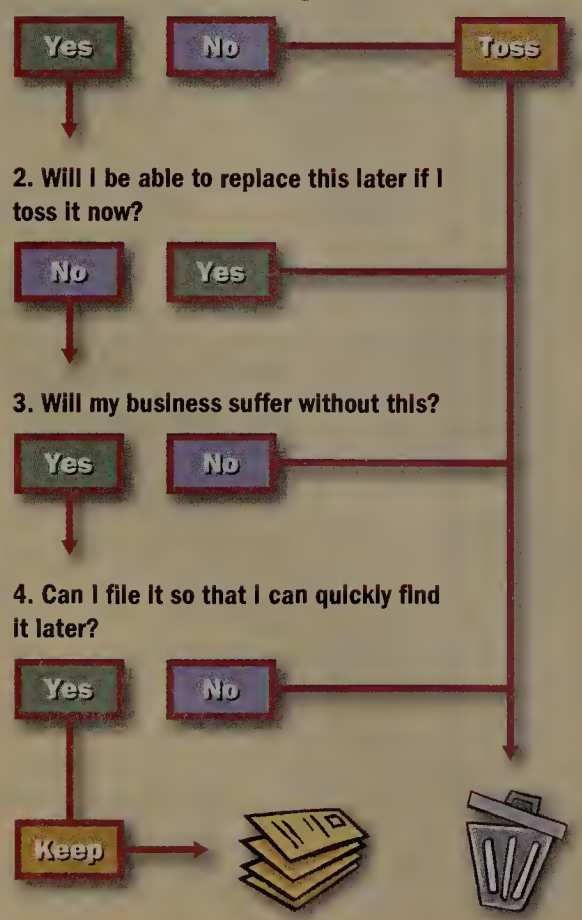
and expenses per client and project, and each is available for under $100. All three products work in Windows 3.*x* and Windows 95.

TIP Request Call Organizer service from your phone company. Long-distance phone calls billable to various clients are easy to track with the Call Organizer service available from AT&T, Sprint, MCI, and many local carriers. For about $2.50 a month, you can add a two-to-four-digit code following each phone number dialed, each code representing a different client. When your bill comes, it's broken out by code number into distinct groups for easy attachment to the invoices you bill to each client. You also have the option of getting your phone bill on a floppy, letting you plug the calls and respective charges into an invoicing program or a spreadsheet.

Software can help you track the time you spend working for particular clients.

What Papers Should You Toss?

Don't keep papers you can throw away. Follow this four-part test from Lisa Kanarek (author of *Organizing Your Home Office for Success*) to decide if a piece of paper should live or die.



Filing Away the Hours

I had only a handful of clients but already my desk was engulfed by paper. I hadn't seen the "natural mahogany finish" in weeks. I bought a four-drawer filing cabinet, but what I really needed was a way to organize my papers so I could find them without organizing a search party.

TIP Never store your papers flat. "Papers are easier to find when stored vertically in files," notes Lisa Kanarek, author of *Organizing Your Home Office for Success* (Plume/Penguin, 1993, 800/253-6476, $10.95). When new records and reports come into the office, keep them flat for as short a time as possible, preferably in a stacking bin pending your "file 'em or dump 'em" decisions.

TIP Don't get sentimental. When you go through your horizontal stack, file only those papers that you have a very good reason to save. Simply recycle or throw out the rest.

TIP Separate business and personal papers. While the urge to consolidate your paperwork might be enticing, filing personal and business papers together will be a nightmare come tax time. And in general the more papers you have in the same folders, the more time it takes to find what you're looking for.

TIP Use colored file folders. The actual way you decide to file papers—alphabetically by client, numerically by job order number, categorically by subject, or what have you—depends on your particular business needs. No matter what method you adopt, use either colored file folders or colored dot labels to arrange your files for easy, on-sight retrieval. The colors can, for example, represent the type of project or client or the stages of job completion. This suggestion was probably the one I got most frequently from home office professionals in CompuServe's Working From Home Forum (go work).

Security Surprises

I assumed I had insurance coverage for my home office because I had renter's insurance. But such was not the case. Home offices, I discovered, are not covered under homeowner's or renter's insurance for liability, fire, and theft. You need either a *separate policy* or a *rider* to your current one. And when you consider that PC theft has risen to more than a billion dollars a year, according to computer insurance specialists Safeware, such coverage is a must.

The next surprise was discovering that few insurance companies are willing to provide insurance for offices (particularly home offices) full of computer equipment. Luckily, other options are available.

TIP Join a home office professionals group. The Home Business Institute (914/946-6600) now has 40,000 members nationwide. Many join just for the insurance benefits, which currently include a minimum commercial policy covering $5000 in property loss and $300,000 in liability for a $150 annual premium. Mem-

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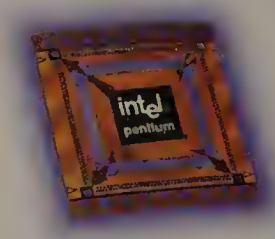

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Circle 233 on reader service card

You Sleep, Your Office Doesn't

When I close up shop for the night and make that long commute to the living room, my office keeps working. Yours can, too. Take a few hints from my midnight maneuverings:

Use fax broadcasting to get your message out. My Espresso Personal Communications Manager may look like a small nuclear power plant, but it actually is quite efficient: Come midnight it automatically broadcasts marketing solicitation faxes to prospective clients, freeing it for other work during office hours and keeping my phone costs down. When it's connected to my computer—it works fine on its own as well—I can retrieve and view faxes from a remote PC, configure it for fax on demand, and broadcast faxes.

Schedule backups to protect your data. If it's Tuesday, the data on my hard disk is being copied onto my Colorado 700 Tape Drive. You can use any number of available backup solutions. But do it regularly—at least weekly—and keep the backup media in a safe place off site.

Collect your e-mail at night. While I sleep, my PC calls America Online, CompuServe, and my Internet service provider to download new messages. In AOL, you can select *Mail • Flash-Session* to coordinate automatic e-mail sweeps and file downloads. CompuServe's Navigator add-on (go cissoft) performs the same functions. To claim your Internet e-mail when you're not there, there's the free Eudora Light (the more powerful Eudora Pro costs $89).

Control your office computer remotely. With Server Technology's Power On/Off box, I can power up or turn off my PC from any phone in the world and use it with remote software. If for some reason it locks up, I can sequence a power off, 30-second wait, and power on to get it up and running again.

• **Espresso Personal Communications Manager** $299; Beond Communications, Inc.; 800/310-9595 **Reader service no. 661**
• **Eudora Light** free, **Eudora Pro** $89; QualComm; 800/238-3672; http://www.qualcom.com/quest **Reader service no. 662**
• **Power On/Off** $169; Server Technology, Inc.; 800/835-1515 **Reader service no. 663**

bership dues are $49 a year, but a six-month trial is available for only $19.95. The dues are well worth it, considering the other benefits, which include telephone savings, life and medical insurance, computer support, and debt collection services. Another group, the Independent Business Alliance (212/513-1446), also offers worthwhile insurance plans for its members.

TIP Buy separate computer insurance. Safeware (800/848-3469), an insurance company based in Columbus, Ohio, that specializes in computer insurance, will write you a policy that covers just your computer equipment. Rates start at a $49 annual premium for $2000 of coverage and slide to $159 for up to $17,000 of equipment protection.

TIP Be prepared for burglars. It still pays to invest in prevention. Burglars are usually in a hurry, and anything that slows them down could discourage them from taking your business elsewhere. Secure-It's $49.95 Kablit cabling package includes a 10-foot cable and lock that thread through the computer and peripherals and then around your desk. A burglar would have to be a Houdini to take your computer.

TIP Have proof of ownership. If you are robbed, you'll have to be prepared for the inevitable requests for proof of ownership the insurance company will throw at you. You can either videotape your equipment or photograph each item and attach the pictures to copies of corresponding receipts. Or you can use a simple log that lists each item's date of purchase, serial number, and price. In any case, store this proof in a safe deposit box, not at your office.

PC WORLD online *The files in this article are available on PC World Online. Michael S. Lasky is a senior associate editor for* PC World.

For more information about all products in this article, circle reader service no. 906.

Where to Buy

• **Bogen Friday Communications Manager** $169; Bogen Communications; 800/942-6436 **Reader service no. 652**
• **Digital Answering System Speakerphone** $180; Lucent Technologies; 800/222-3111 **Reader service no. 653**
• **Kablit** $49.95; Secure-It; 800/451-7592 **Reader service no. 654**
• **Meridian 9516** $270; Northern Telecom; 800/466-7835 **Reader service no. 655**
• **PC Phone Manager** $89.95; Algo Communications; 214/490-5487 **Reader service no. 656**
• **PhoneWorks 28.8** $299; Connectware, Inc.; 800/357-0852 **Reader service no. 657**
• **Responsive Time Logger 2.0** $79; Responsive Software; 800/669-4611 **Reader service no. 658**
• **Timeslips Personal Plus** $99.95; Timeslips Corp.; 800/285-0999 **Reader service no. 659**
• **TimeWin 1.2.1** $49.95 registration fee; Thunder Creek Software; 403/264-0854, 403/225-0352; mcneillb@cuug.ab.ca **Reader service no. 660**

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Hot Picks

BY STEVE BASS

for the Home Office

These are a few of our favorite things.

Mouse on a Pedestal

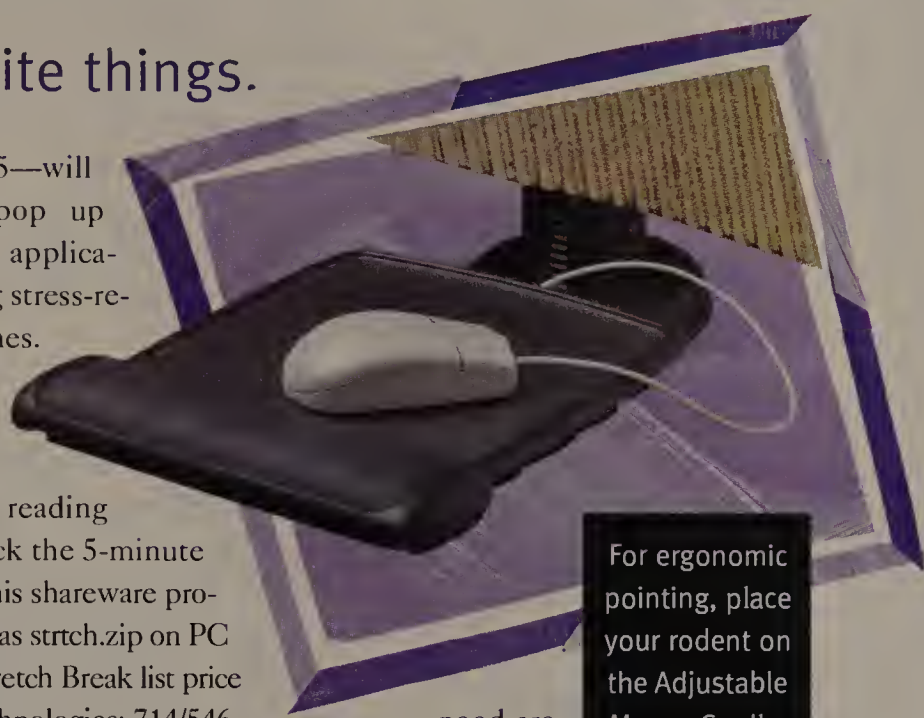
I found just the right home for my mouse: an adjustable, swiveling pad that sits on a metal arm attached to the bottom of my desk. The arm pivots left and right up to 30 degrees, following my hand like a trained, umm, mouse. A bit of a pain to install if you hate crawling underneath your desk, the Mouse Cradle has a large surface, about 8.5 by 8 inches, with a comfortable wrist rest at the edge. Ergonomically, it's ideal because its height is adjustable in quarter-inch increments, and it slides—mouse and all—under the desk when not in use. Adjustable Mouse Cradle street price $49.95; Ring King; 800/553-9647, 319/263-8144, 800/272-2382 (fax).

Reader service no. 664

Take a Break and Stretch

After a day at the computer, your back aches, your shoulders are sore, and your neck's tight. So relax your muscles with Stretch Break. At intervals that you set, this Windows 3.*x* program—which runs fine on Windows 95—will automatically pop up over your other applications, displaying stress-reducing stretches. And if you're in the middle of something really important (say, reading *Dilbert*), just click the 5-minute delay button. This shareware program is available as strtch.zip on PC World Online. Stretch Break list price $24.95; Para Technologies; 714/546-8619, 714/546-4607 (fax); 72317.726@compuserve.com.

Reader service no. 666



For ergonomic pointing, place your rodent on the Adjustable Mouse Cradle.

FedEx Finder

The airbills are in the trash and my pen's in the drawer. That's because I now use my computer to ship all my Federal Express packages. Just fill in the on-screen form, and a click later FedEx Ship uses my modem to call in the information *and* request a courier. Then I use the program to print a bar coded, plain-paper shipping document and receipt. Later, I can use real-time tracking to determine if the package has arrived—or where in the world it is. The free software is available both online and by mail—all you need are a FedEx account and a modem. It works with Windows 3.*x* and Windows 95. By the time you read this, you should be able to fill out the form right on FedEx's World Wide Web page; you can already check a delivery's status there. FedEx Ship free; 800/463-3339; http://www.fedex.com.

Reader service no. 665

FedEx Ship: the next best thing to e-mailing packages.

Audio at Your Fingertips

Don't have room on your desk for speakers *and* a keyboard? Okay, how about a keyboard with a pair of Altec Lansing speakers built-in? How about adding a hands-free omnidirectional microphone, a volume control knob, and a headset jack—all at a street price of about $79? We're talking about Maxi Sound, a full keyboard that ends desktop clutter while bringing audio to your desktop. The 3.5-watt Lansing speakers are no audiophile's dream, but they're fine for most multimedia applications. The keyboard itself has a good, crisp, solid feel—although the volume control is a bit sticky—and the whole thing in-

cludes a two-year warranty. To keep wiring down, one cable connects the keyboard to your computer and the speakers to the sound card. And if no one's listening, you can even sneak in an occasional *Gilligan's Island* sound clip. Maxi Sound list price $89; Maxi Switch; 520/294-5450, 520/294-6890 (fax).

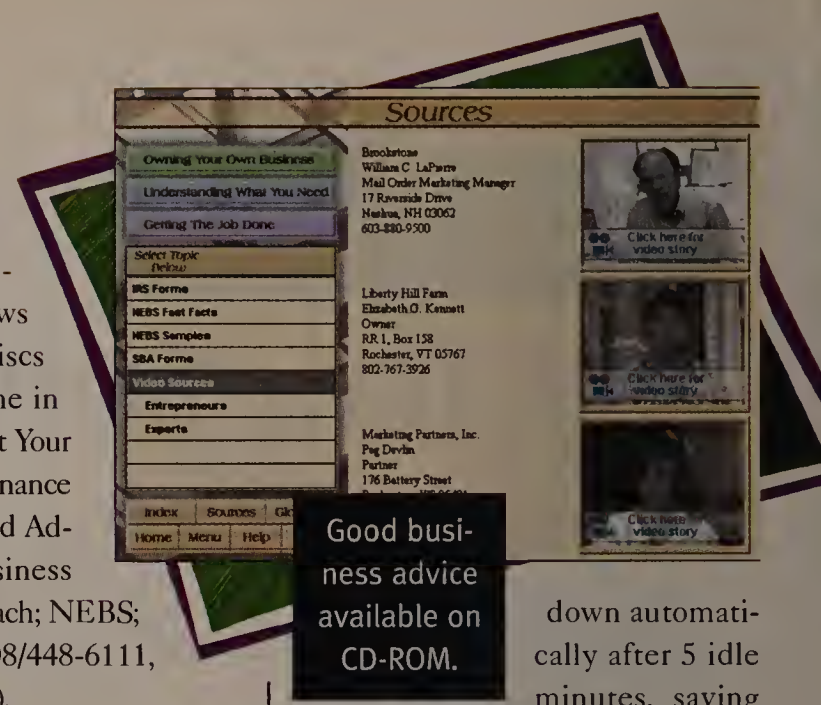
Reader service no. 667

Small-Business Jump Starts

Up in the air about starting your own business? Here are three interactive CD-ROMs filled with the kind of rock-solid information every new business needs. Start with the aptly named Start Your Own Business, which tells you all about the riskiest—and safest—businesses to start, the ins and outs of permits and licenses, how to find the right insurance, and ways to keep your precious ideas protected. Before you open your doors, get a financial kick start with Finance Your Business. You'll learn what lenders want to hear, discover methods for projecting long-term costs, and pick up techniques to measure the profitability of your new enterprise. If you need help with marketing, Advertise Your Business supplies advice in such areas as copywriting ads, Yellow Pages advertising, strategies for those on shoestring budgets, and trade show promotions. Designed for Windows 3.*x*, all three discs also work just fine in Windows 95. Start Your Own Business, Finance Your Business, and Advertise Your Business list price $49.95 each; NEBS; 800/882-5254, 508/448-6111, 508/448-2369 (fax).

Reader service no. 668

Seiko's Smart Business Card Reader is a small scanner that does one job very well.



Good business advice available on CD-ROM.

Pick a Card, Then Toss It

Your desk is littered with business cards that really belong in a database. Enter Seiko's Smart Business Card Reader, a sleek-looking miniscanner that takes up about as much desk space as a can of soda. This device can scan a business card in 15 seconds, converting characters into data for its own contact database, which easily exports to many popular contact managers, including Act, PackRat, GoldMine, and Maximizer. On the downside, the Card Reader doesn't read every card perfectly (angled and low-contrast text didn't fare well at all), and it requires a serial port all to itself (haven't these people heard of parallel pass-throughs?). Smart Business Card Reader street price $199; Seiko; 800/688-0817, 408/922-5900; slp_info@seikosj.com.

Reader service no. 669

A Copier for the Rest of Us

Instead of schlepping to the local Kinko's, I get instant photocopies with the Canon 720. It cranks out a fast 8 copies per minute from its 250-sheet tray. You can enlarge or reduce copies from 70 to 141 percent, in 1 percent increments, and the copies are sharp thanks to a stationary platen. The copier uses a single cartridge that combines the drum, development unit, and toner, making it easy to replace parts. Another plus: It's Energy Star compliant, shutting down automatically after 5 idle minutes, saving me money and not overheating my small office. Canon PC 720 Personal Copier street price $699; Canon; 800/652-2666, 714/438-3317 (fax); http://www.usa.canon.com.

Reader service no. 670

Power to the PC

My data and I have been through a lot together, including a blackout and a wild, file-destroying power surge. I finally wised up and got the UPStart, a slim, LED-bedecked surge protector and uninterruptible power supply that fits neatly beneath my monitor. The UPStart kicks in during a power loss, saving open files and gracefully shutting down the system after a minute or so. Its five power outlets are arranged so I can plug in several bulky transformers at once. My only complaint: UPStart hogs a serial port, so if your mouse and modem need the two that come with your PC, you're stuck. UPStart All-in-One Power Center street price $200; SL Waber; 800/634-1485, 609/866-8888.

Reader service no. 671

PC WORLD online *The files mentioned in this article are available on PC World Online. Contributing Editor Steve Bass is president of the Pasadena IBM Users Group. He can be reached on PC World Online. See page 14 for contact information.*

For more information about all products in this article, circle reader service no. 907.

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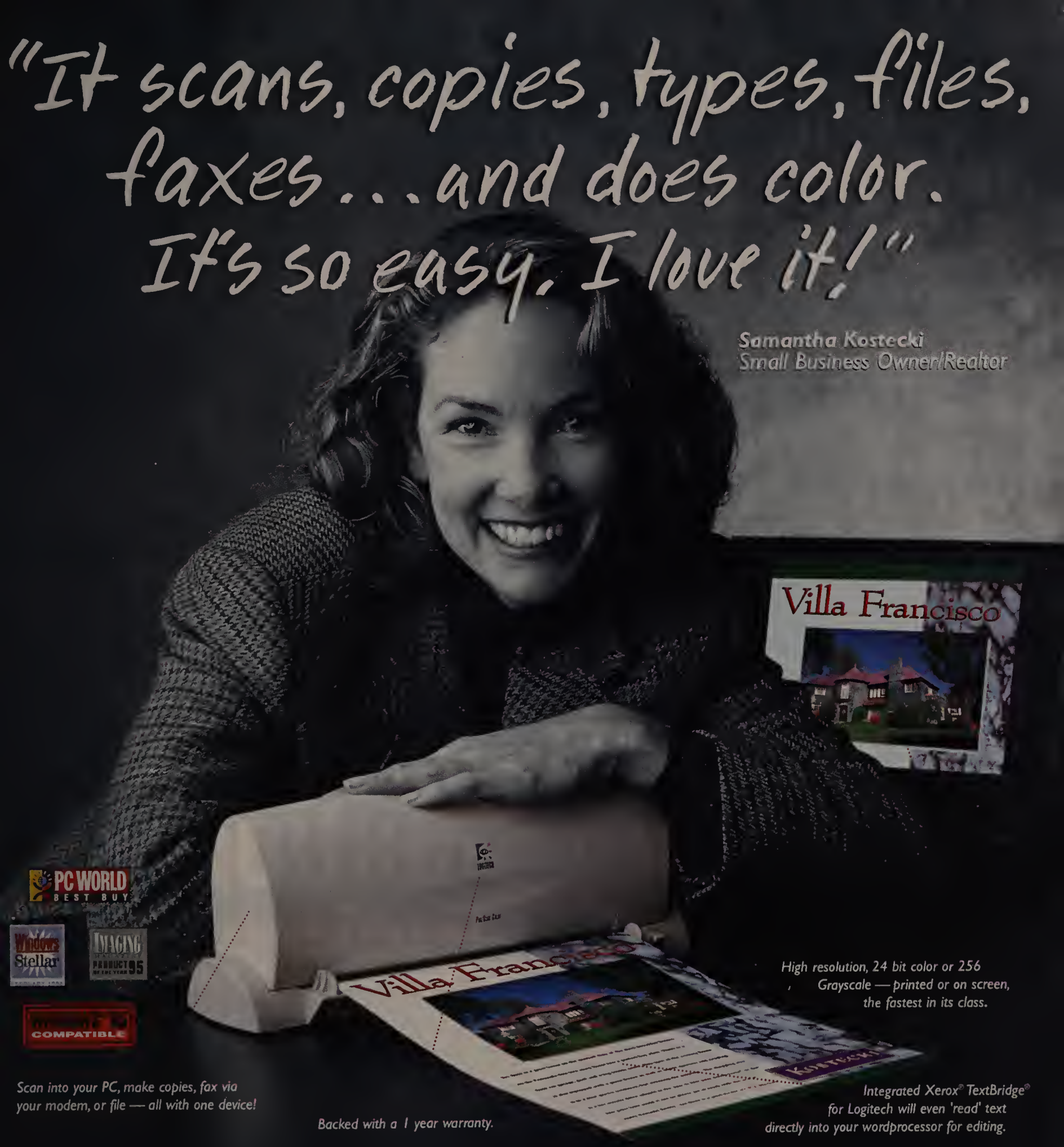
Small Business Owner/Realtor



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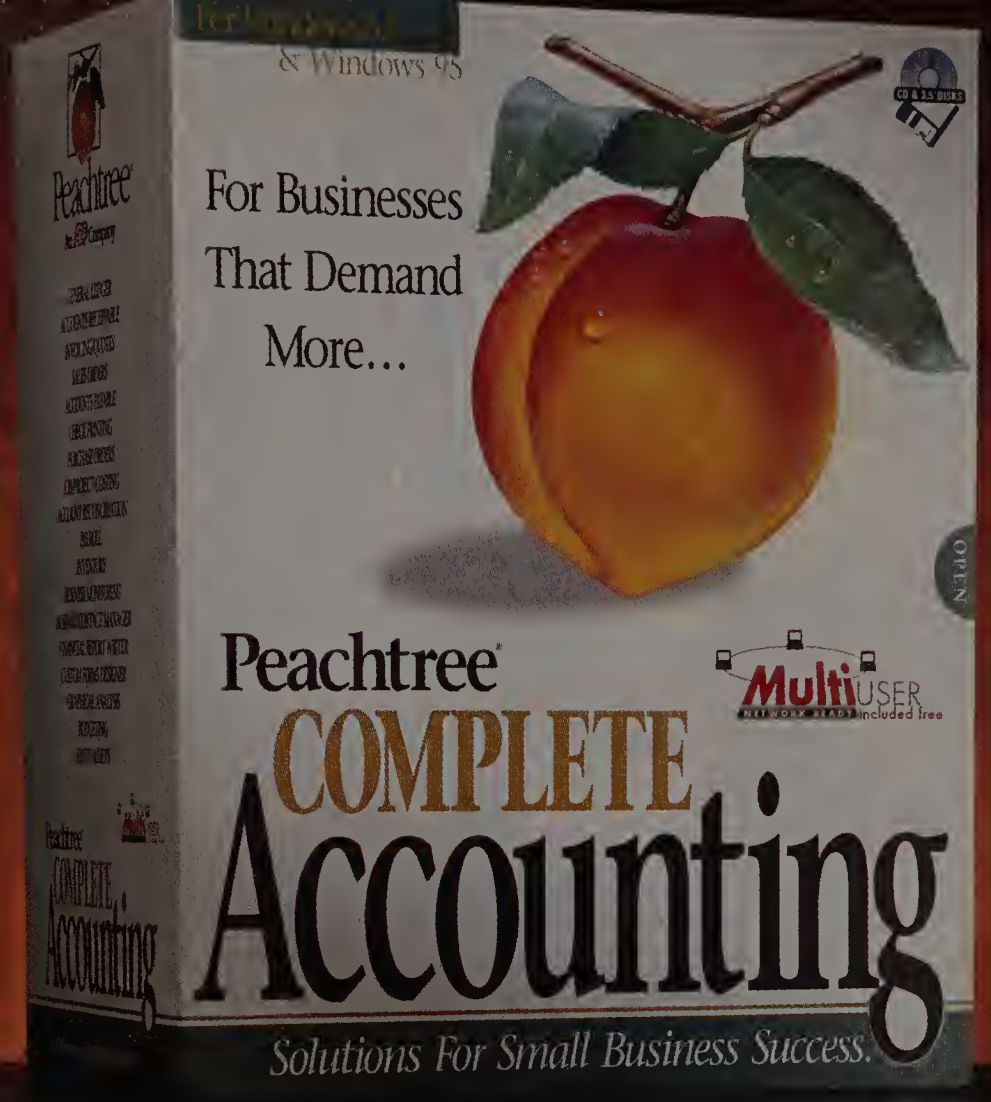

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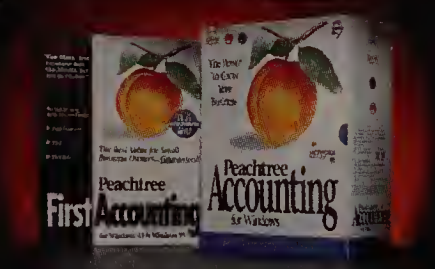

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PC WORLD TOP 20 NOTEBOOK PCs

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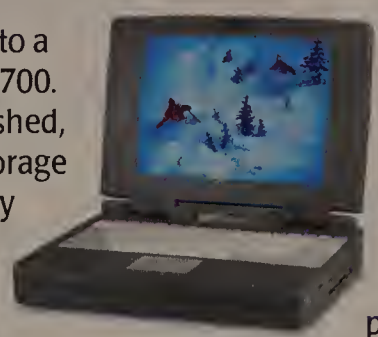

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Dell's featured computer artist is Nance Paternoster of San Francisco, CA.

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HELP LINE Q&A

Boot to Windows 3.1 or Windows 95

Q I recently installed Windows 95 over Windows 3.1. I want to keep Windows 95, but I need to use Windows 3.1 occasionally in order to run Adobe Photoshop 3.0 and Illustrator 4.0—it's not yet worth it for me to upgrade to the Windows 95 versions of those applications. Is there a way to install Windows 3.1 without uninstalling Windows 95, and select the earlier version when I boot up?
Allen Katz, Brooklyn

A Windows 3.1, 3.11, or any version of Windows for Workgroups runs just fine on top of Windows 95's real-mode operating system core, so you don't need to reinstall your old version of DOS or uninstall Windows 95. But you *will* need to do three things to run both Windows 3.1 and Windows 95:

1. Make Windows 95 stop loading by default at boot-up.
2. Edit config.sys and autoexec.bat so that they let you choose between Windows 3.1 and Windows 95 at boot-up.
3. Reinstall Windows 3.1 to a new directory.

For the first step, select *Start•Run*, type **attrib -s -h -r c:\msdos.sys** in the Open field, click *OK*, then open the file in your favorite text editor. In the '[Options]' section, change the line BootGUI=1 to **BootGUI=0**, save and close the file, and reset its system, hidden, and read-only attributes with the command **attrib +s +h +r c:\msdos.sys**. The next time you start or restart your system, Windows will boot to the command prompt. To start Windows 95, type **win**, just like in the good old days.

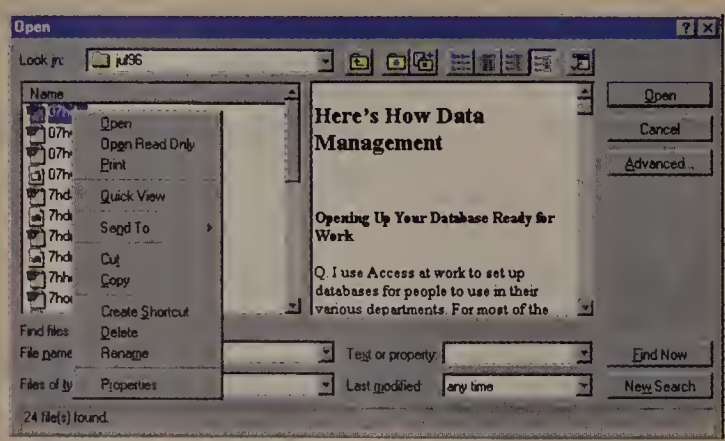
The second step is to add menus to your config.sys and autoexec.bat files that let you choose between two configurations. **FIGURES 1** and **2** show the config.sys and autoexec.bat multiconfiguration files from one of my systems.

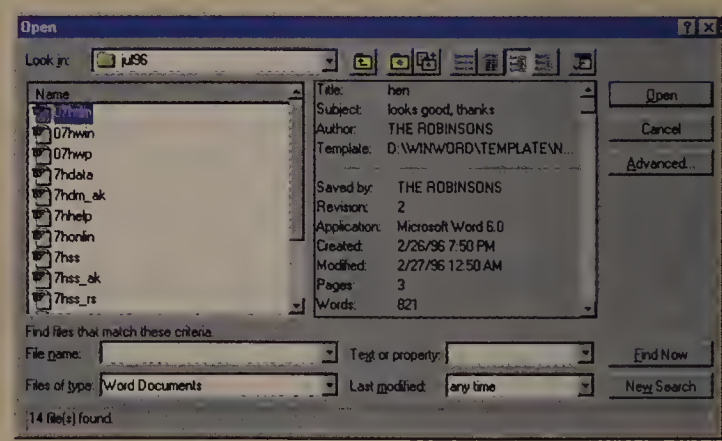
The Windows 95 configuration may be quite minimal; strictly speaking, config.sys and autoexec.bat aren't even required. Your Windows 3.1 configuration should load any real-mode drivers and TSRs required to support your CD-ROM drive, mouse, or other hardware, plus memory managers, disk caching, and environment variables.

Important: The Windows 3.1 path in your autoexec.bat must point to the Windows 3.1 directory rather than to the Windows 95 directory. Unfortunately, Windows 95 puts the Windows 95 directory at the beginning of your path, no matter what autoexec.bat's

Manipulate Files Without Leaving Your Windows 95 Applications

The File Open dialog box acts as a mini-Explorer window for many Windows 95 applications; you can delete, copy, and otherwise manipulate files by simply right-clicking them. Click the Preview icon to display a highlighted file's contents in the right pane (see below left) if you want to know what's in the file before you do anything with it. Select the Properties icon to call up detailed information about the file itself (see below right).





DOUG ROSS

```
CONFIG.SYS
[menu]
menuitem=Win95, Start Windows 95
menuitem=Win31, Start Windows 3.1
menudefault=Win31, 15
[common]
device=c:\windows\himem.sys
device=c:\windows\emm386.exe noems
dos=high,umb
[Win95]
[Win31]
device=c:\aspi4dos.sys
device=c:\aspicd.sys /d:aspicd0
[common]
```

FIGURE 1: CHOOSE WINDOWS 95 OR WINDOWS 3.1 when you boot up by adding a menu to your config.sys file.

```
AUTOEXEC.BAT
@echo off
echo Configuration is %config%
;path=c:\windows;c:\windows\command
goto %config%
:Win95
win
goto end
:Win31
lh c:\windows\smartdrv.exe 2048 128
lh c:\windows\command\mscdex.exe /d:aspicd0 /l:h
lh c:\mouse.com
path=c:\win31;c:\windows\command
win
:end
```

FIGURE 2: BYPASS WINDOWS 95'S OVERRIDE BEHAVIOR by adding two path statements to your autoexec.bat file.

path= statement says. The trick is to have two path statements—one that triggers Windows 95's annoying override behavior, and one that points to the Windows 3.1 directory. The strange part of this trick is that you must disable the first path statement by preceding it with a semicolon; the rem statement won't do the job. If you don't need a path for your Windows 95 configuration, place the statement **;path=** (with no directories) on the line before your Windows 3.1 path statement.

The [common] label at the end of config.sys allows other programs to add statements that both configurations will see. You may not want new statements to be shared by both versions, however. For example, Windows for Workgroups 3.11 will add the 32-bit file access driver ifshlp.sys and prevent Windows 95 from booting. In this example, deleting [common] will make new config.sys statements a part of the win31 block only.

Once you're satisfied that your multiple-configuration boot files are loading properly, boot to your Windows 3.1 configuration and install Windows 3.1 to the directory in autoexec.bat's 'set path=' statement (I chose win31). It won't hurt to dig up installation disks for all your peripherals, and even a copy of your old Windows 3.1 config.sys and autoexec.bat files.

Near the end of installation, the setup utility in Windows 3.1 may inform you that it couldn't modify config.sys and autoexec.bat files because of the multiple configurations. When setup is complete, go to the Windows 3.1 directory and peruse the contents of config.win and autoexec.win. If nothing Windows has added (in uppercase) looks

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like a recipe for boot disaster, make backups of your current config.sys and autoexec.bat, then copy the new files to your root directory with the commands **copy config.win c:\config.sys** and **copy autoexec.win c:\autoexec.bat.**

When you reboot, Windows 95 presents a menu of the two Windows versions. Select one, and it starts up.

Speed Printing by Using ECP

Q My new PC has an Extended Capability Port. Do I need a special type of parallel cable to use the ECP with my Okidata OL400e printer?
Andrew Gamble, Richmond, Kentucky

A You do need an ECP-compatible printer cable to take advantage of your PC's high-speed bidirectional transmission capabilities. ECP's data compression can make printing, especially of graphics, 50 to 100 times faster than with a standard parallel connection. Unfortunately, your printer's parallel port must also support ECP to see this benefit. Older models, including the OL400e, offer only standard Centronic parallel and RS-232C serial connectors. Though you won't get any speed benefits, your computer's ECP port is completely compatible with your old printer and cable.

Where's QuickView?

Q I keep reading about a file viewer called QuickView that's supposedly built into Windows 95, but it's not on my PC, and it's not an installation option. I bought the floppy disk version of Win 95, which doesn't include all the utilities on the CD-ROM version. Is QuickView one of the tools that were left out? If so, how can I obtain it?
Robert Wilson, Downers Grove, Illinois

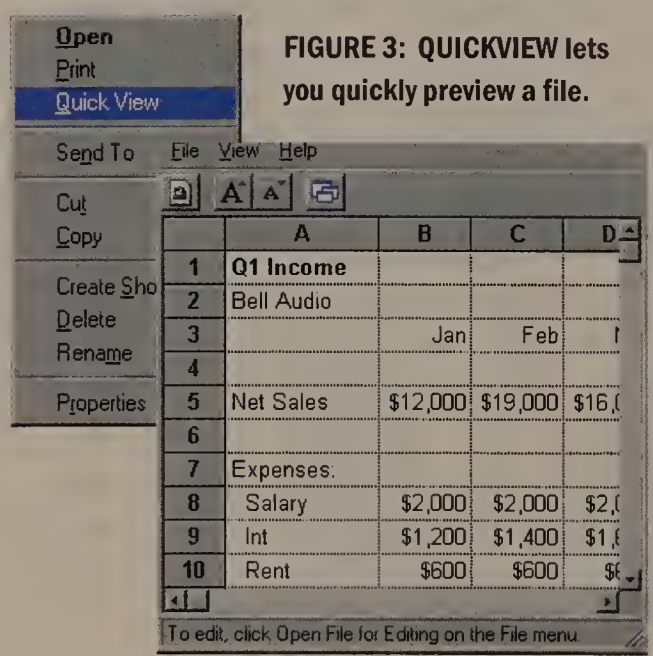

FIGURE 3: QUICKVIEW lets you quickly preview a file.

A Yes, Microsoft did leave QuickView out of the floppy version of Windows 95, but you can download a copy (quikvu.exe) from Microsoft's FTP site (ftp.microsoft.com\softlib\mslfiles\). Microsoft's Windows CD-ROM Extras Web page (http:// www.microsoft.com/windows/software/cdextras.htm) contains more utilities not included on the floppy version—except for QuickView.

For $9.95, you can get all the CD-ROM extras on floppies, including the dial-up networking scripter, policy editor (for controlling each user's desktop settings), system monitor, CD player, and multiple language support tools—just use the coupon in the manual (*Introducing Microsoft Windows 95*).

QuickView (see **FIGURE 3**) can be addictive. If you become a QuickView junkie, you may want to upgrade to QuickView Plus, an expanded product sold by the makers of QuickView (which Microsoft licensed). QuickView Plus reads about 200 file types, compared with the regular QuickView's 30 or so file types.

- **QuickView Plus** $50; Inso Corp.; 800/333-1395
  Reader service no. 691

Search Windows Help Files

Q I'm looking for a utility that will let me search Windows help files for a particular word. The .hlp files have a keyword index, true, but that's only useful if the file's author did a good job of assigning keywords to the topics. Since I'm seldom on the same wavelength as the author, finding the help I need is often a shot in the dark. Do you have any advice?
Gary Shweid, Millbrae, California

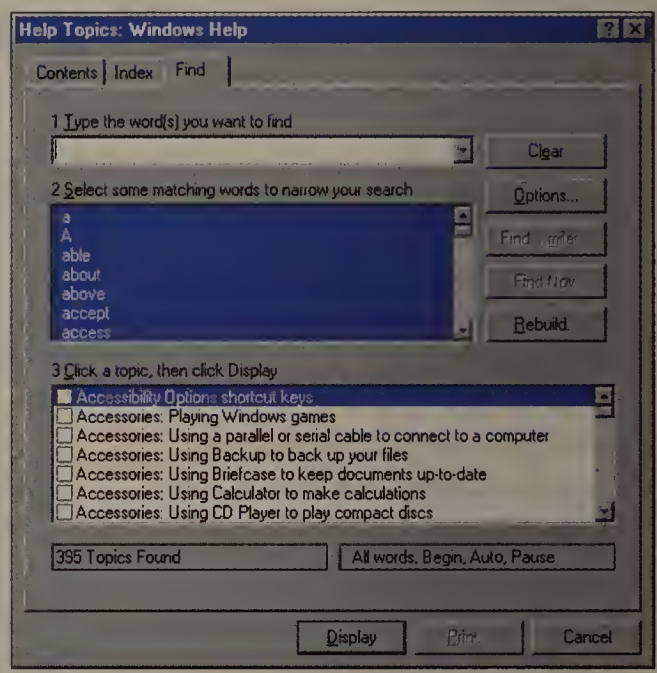

FIGURE 4: INDEX EVERY WORD IN THE WINDOWS 95 HELP FILES to search for what you need, instead of second-guessing how a help file is categorized.

A In Windows 95, you can get an index of *all* words in the help file (or files). First select *Start•Help*, then click the *Find* tab and the *Rebuild* button. Finally, select *Maximize search capabilities*. When the indexer is finished, you can search for any word in the help file or files (see **FIGURE 4**).

The trick doesn't work for Windows 3.1–style help files, though, because they lack the full-text indexing feature. If you're determined to scour Windows 3.1 help files, try the pricey but powerful program Help Browser 2.0 from Cascadilla Press. You can download a demo version from the company's Web page (http://www.cascadilla.com).

- **Help Browser 2.0** $89; Cascadilla Press; 617/776-2370
  Reader service no. 692

By Scott Spanbauer

Scott Spanbauer is a contributing editor for PC World *and author of* The No B.S. Guide to Windows 95 *(No Starch Press, 1996, 800/420-7240).* Help Line *welcomes your questions and tips and pays $50 for published items. See page 14 for contact information.*

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SPREADSHEETS Q & A

Add a Drop-Down List to an Excel Form

Q I've set up a mileage sheet that employees in my division use for travel arrangements. Users fill in their name and address, enter the travel mileage in a table, print it, and submit it for approval. I've heard Excel will let me create a drop-down list to fill in the name and address automatically, but I don't know how to set it up. Can you help?
Carroll West, Cayce, South Carolina

A I use this kind of arrangement all the time. The solution I've cooked up, illustrated in **FIGURE 1**, is based on three elements: a database of names and addresses, a data entry form with a drop-down list of the names in the database, and a set of formulas that copy a person's address and social security number from the database to the data-entry form.

Here's how to set the model up.

1. In a new worksheet, enter the data shown at the top of Figure 1.

2. Place the pointer in cell G1, and select *Insert•Name•Define* to assign the name **e_empindex** to cell G1.

3. Select *Insert•Name•Define* again, enter **e_data** in the Names in Workbook box, and in the 'Refers to' box, enter the formula **=offset(Sheet1!A1,1,0,counta(Sheet1!$A:$A)-1,4)** to create a dynamic range. This range, which begins on cell A2, is four columns wide and as many rows high as there are entries in column A of the sheet, minus one row.

4. Click the *Sheet 2* tab, and enter the labels shown in cells A1 and A3 and A8:C8 of the figure. Enter the formula **=index(e_data,e_empindex,1)** in cell B3; **=t(index(e_data,e_empindex,2))** in cell B4; **=t(index(e_data,e_empindex,3))** in cell B5; **="SSN: "&index(e_data,e_empindex,4)** in cell B6. These formulas find the record in the database that corresponds to the value in E_EmpIndex. The t() functions in B4 and B5 convert the value of the formula to text, eliminating a zero value if the database value is missing.

5. To create the drop-down box, select *View•Toolbars*, and select the *Forms* toolbar. Click the drop-down tool and draw the box on sheet 2 as shown. To link the box to the database and the index cell, right-click it and select *Format Object*. Click the *Control* tab and enter **e_data** as the Input Range, and **e_empindex** as the Cell Link. Click the *Properties* tab and deselect *Print Object*, then click *OK*.

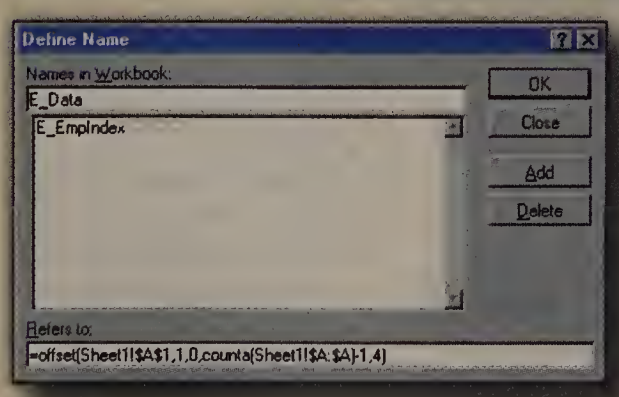
6. Click outside of the drop-down box to deselect it, then test it by clicking the Down arrow and selecting a name. The appropriate name and address will show up on the form.

Add a Drop-Down Box to a Data Entry Form in Excel

❶ In sheet 1, enter the data in ranges A1:D4 and F1:G1.

	A	B	C	D	E	F	G
1	Name	Address	City/State/Zip	SS#		E_EmpIndex	3
2	Pat Sanchez	123 East St	Cayce, SC 21345	123-45-6789			
3	Terry Johnson	234 West St.	Charleston, SC 21222	234-56-7890			
4	Karol Jastrzebski	234 South St.	Columbia, SC 21333	345-67-8901			

❷ Assign the label in cell F1 as the name for cell G1.

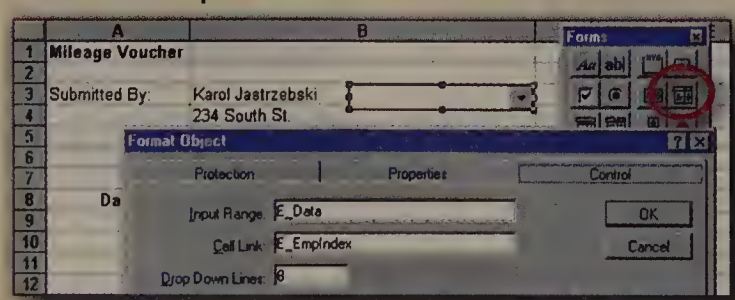


❸ Create a dynamic database range.

❹ In sheet 2, enter the labels in cells A1 and A3 and range A8:C8 and the formulas in range B3:B6.

	A	B	C
1	Mileage Voucher		
2			
3	Submitted By:	=INDEX(E_Data,E_EmpIndex,1)	
4		=T(INDEX(E_Data,E_EmpIndex,2))	
5		=T(INDEX(E_Data,E_EmpIndex,3))	
6		="SSN: "&INDEX(E_Data,E_EmpIndex,4)	
7			
8	Date	Miles	Gas

❺ Create the drop-down box.



❻ Select a name from the drop-down box, and Excel automatically fills in the form.

	A	B	C
1	Mileage Voucher		
2			
3	Submitted By:	Karol Jastrzebski	
4		234 South St.	
5		Columbia, SC 21333	
6		SSN: 345-67-8901	
7			
8	Date	Miles	Gas

Karol Jastrzebski
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FIGURE 1: THE INDEX FORMULAS ENTERED IN STEP 4 LET YOU USE A DROP-DOWN LIST to pull information from a database.

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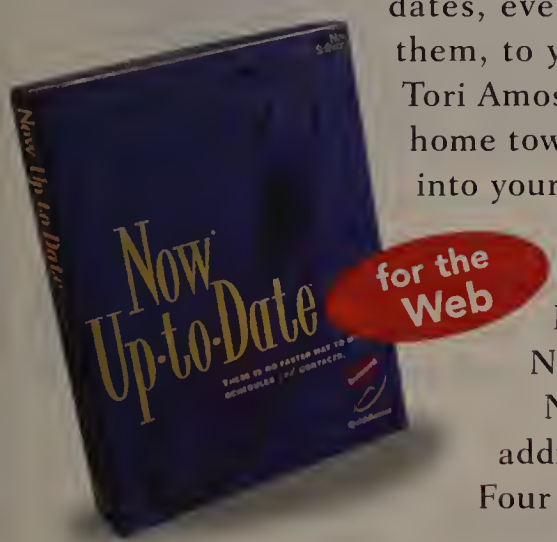

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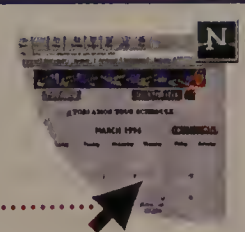

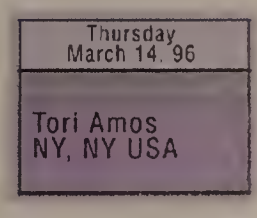

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Circle 164 on reader service card

Taking Graph "Snapshots" in Excel

Q I model my company's inventory in an Excel worksheet, changing the underlying assumptions for different scenarios. I'd like to keep a graph for each scenario, but the graph changes as I change the data in a worksheet. For a given data set, I'd like to take a "snapshot" of the graph, change the data to create a new graph, take a snapshot, and so on. How do I get the snapshots?
Milton Edwards,
Chapel Hill, North Carolina

A The easiest solution is to copy the graph, then paste it back as a picture. Once you've entered a set of data, select the graph, choose *Edit•Copy*, go to a blank area of the worksheet or to another sheet, and choose *Edit•Paste Special*. In the Paste Special dialog box, select *Picture* in the As list, and click *OK*. The resulting graph is just an image of the original, so it no longer changes when you change the data.

Run an Unalarming Excel Macro

Q I've created an Excel macro to copy a large range of data, but when I run it, the macro halts and displays the alert 'Selection is too large. Continue without Undo?' Can I force the macro to continue without showing the alert?
Phil Tometich, St. Louis

A Change Excel's DisplayAlerts property to False by adding the code in **FIGURE 2** to the beginning of your macro. You'll no longer be bothered with alerts like 'Continue without Undo', or 'Save Changes'.

```
Sub BigCopy()
   Application.DisplayAlerts = False
   Range("A1:C15000").Copy (Range("Q1"))
End Sub
```

FIGURE 2: TURN OFF EXCEL MACRO ALERTS by adding this code to the beginning of your macro.

Ever Upward With 1-2-3

Q In our lab, we grow bacteria under varying conditions and count the colonies daily to see if they've increased. I need a list to track growth only. If I found 100 colonies yesterday and 110 today, I'd enter today's date and 10. If I found 108 tomorrow, I'd enter nothing, but if the count was 114 on the next day, I'd enter that date and 6. How do I do this in 1-2-3 release 5?
Gary Bladon, Gainesville, Florida

```
A     A      B      C      D      E      F      G
1   \x     {if newvalue>oldvalue}{\x_1}
2          {let oldvalue,newvalue}
3          {select newvalue}
4
5   \x_1   {select startcell}
6          {select-range-relative 0,0,0,0,@count(a1..a8192)-2,0}
7          {let @cellpointer("address"),@now}
8          {style-number-format "date-long-international"}
9          {r}
10         {let @cellpointer("address"),newvalue-oldvalue}
11         {return}
```

FIGURE 3: RECORD ONLY POSITIVE CHANGES IN YOUR DATA with this 1-2-3 macro.

A When I encounter similar problems in inventory and accounting applications, I use a macro to take values from a data entry cell and pop them into a list. **FIGURE 3** highlights the technique.

To build the model (available on PC World Online as 7hss2.wk4), first enter the macro in Figure 3. Select range A1..A5, then select *Range•Name*. Click *Use Labels*, then *OK*. Click *New Sheet*, and enter the labels in range A1..B4 of the figure in the next column. Assign the names **newvalue** and **oldvalue** to cells B1 and B2, and name cell A4 **startcell**. When you first run the macro, enter yesterday's value in cell B2 and today's value in B1, and press **<Ctrl>-X**.

The macro compares the count you enter in B1 with the previous count in B2. If it's larger, the macro locates the next empty cell in column A, enters the current date, assigns a format, then puts the increase into column B. Finally, it puts the current count into B2.

Here are the details:

{if newvalue>oldvalue}{\x_1} executes the subroutine in cell B5 if the new count is greater than the old.

{let oldvalue,newvalue} stores the current count in oldvalue.

{select newvalue} returns to the data entry cell for the next value.

{select startcell} activates cell A4.

{select-range-relative 0,0,0,0,@count (A1..A8192)-2,0} selects the next blank cell in column A.

List | Macros

	A	B
1	New value	109
2	Old value	109
3		
4	Date	Increase
5	08/26/95	10
6	08/27/95	6
7	08/29/95	3
8	09/01/95	11
9		

{let @cellpointer("address"),@now} puts the current date in the active cell.

{style-number-format "date-long-international"} assigns the 12/31/93 format to the active cell.

{r} moves the pointer to column B.

{let @cellpointer("address"),newvalue-oldvalue} enters the amount of the increase in column B.

{return} ends the macro.

By Richard Scoville

PC WORLD online *The file cited in this article is available on PC World Online. Contributing Editor Richard Scoville is a software training consultant in Chapel Hill, North Carolina.* Spreadsheets *welcomes your questions and tips and pays $50 for published items. See page 14 for contact information.*

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WORD PROCESSING Q&A

Stop Bumping Text From Bottom of Page

Q When I create a document in Word 6.0 for Windows, lines or whole paragraphs sometimes move from the page I'm typing on to the next page, causing large bottom margins. Where do I find the setting that stops this?
Eric Hart, Glendale, Arizona

A Several paragraph settings in Word determine where page breaks occur. Fortunately, they're all in one place.

Here are the instructions for changing the settings once and for all. The steps, which are illustrated in **FIGURE 1**, work in both Word 6.0 for Windows and Word 7.0 for Windows 95.

1. In a blank document, select *Format•Style*. In the Style dialog box, make sure *Normal* is highlighted in the Styles list, and click *Modify*.
2. In the *Modify Style* dialog box, click the *Add to Template* option, then the *Format* button; select *Paragraph*.
3. In the *Paragraph* dialog box, click the *Text Flow* tab. Click each marked option in the Pagination frame to remove its check mark.
4. Click *OK* twice, then click *Close* to return to your blank document. Select *File•Save All* and click *Cancel* when prompted to save your blank document. Word will save your changes in the normal.dot template.

Save a WinWord Template as a Document

Q I want to use a file in Word 6.0 for Windows as a document template. In the Save As dialog box, I selected the Document Template file type and saved the .dot file in the Template directory. When I open this file and add text, though, Word won't let me save the new file as a regular document. Even when I type the file name with the .doc extension, Word saves the file as a template and grays out all other options in the Save As dialog box. What am I doing wrong?
Jerome Raso, Guelph, Ontario

A Word won't let you save a template file as a normal document if you opened the template with the File•Open command. That's how the application protects its templates from being corrupted by unwanted changes.

To create a new document based on a template, select *File•New*, then choose from the Template list in the New dialog box. You'll be able to save the new file as a normal Word document without affecting the template.

Leave Page 1 Unnumbered in Word 7.0

Q I type my school papers in Word 7.0 for Windows 95. To add page numbers, I select View•Header and Footer and click the page number button on the toolbar. This prints the page number on every page, but the standard at my school is to leave the first page unnumbered. I end up having to print the first page separately. Do you have a better solution?
Josh Rednik, Cherry Hill, New Jersey

A Next time you want to insert page numbers in a Word 7.0 document, select *Insert•Page Numbers* instead of using the Header and Footer toolbar. In the Page Numbers dialog box, select a position and alignment, then click the *Show Number on First Page* check box to deselect that option, as in

Turn Off Word's Text Flow Controls

❶ Select Format • Style. Select the Normal style from the Styles list and click the Modify button (not shown).

❷ Click the Format button and select the paragraph format.

❸ Click the Text Flow tab and uncheck all text flow controls.

❹ Save your changes to the normal.dot template.

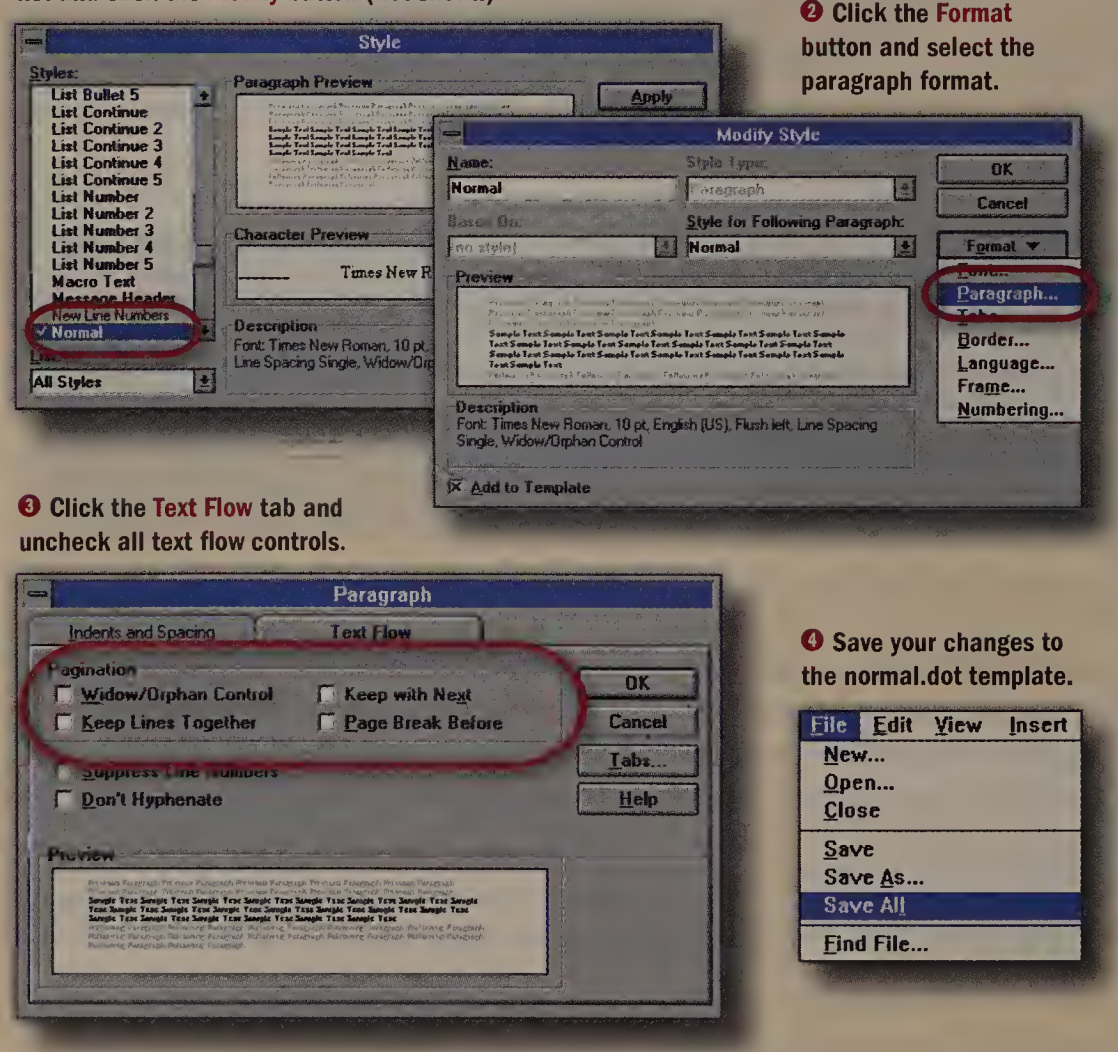

FIGURE 1: WORD'S PARAGRAPH FORMAT includes several settings that determine where a document's page breaks occur. Because the settings are all in one place, they're easy to change.

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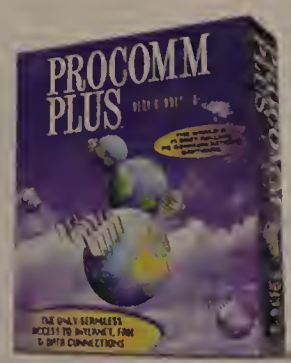

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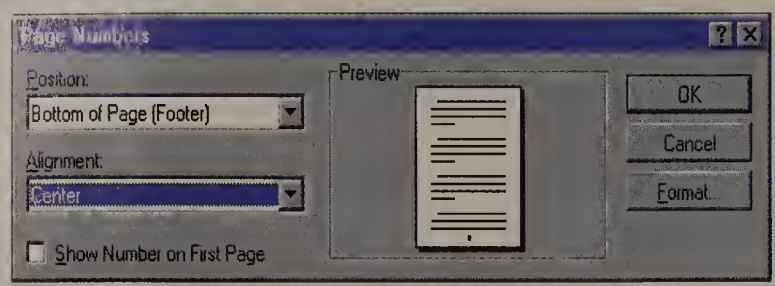

FIGURE 2: START PAGE NUMBERING ON THE SECOND PAGE of a Word document by selecting Insert • Page Number instead of choosing from the Header and Footer toolbar.

FIGURE 2. Click *OK*, and you're done.

To add other information (such as date or time) to the header or footer, select *View•Header and Footer.*

Avoid Unwanted Indents in Word 7.0

Q I've discovered an unusual quirk in Word 7.0. When I'm editing a document and press <Tab> to indent one line in a paragraph, the entire paragraph moves to the right, as if I had indented the whole thing. How do I stop Word from doing this?
Benny Kong, Kalamazoo, Michigan

A You've encountered one of Word's new automated features. By default, when you press the <Tab> key on any line of a paragraph other than the first one, Word assumes that you want the whole paragraph indented.

Fortunately, you can turn this feature off. Select *Tools•Options*, click the *Edit* tab in the Options dialog box, uncheck *Use Tab and Backspace Keys to set Left Indent*, and click *OK*. Word will now let you indent single lines in a paragraph.

Keep Creation Date from Evolving in WordPerfect 6.1

Q I use the Insert•Date feature in WordPerfect for Windows to insert the date I created a document, but each time I open the file to read it, the date changes to that day's date. How do I keep the date from changing, without typing it in manually?
Jeffrey Mehler, Old Lyme, Connecticut

A Simple. Just select *Insert•Date*, as you've been doing, but in the next submenu, select *Date Text*, rather than Date Code. WordPerfect won't update a date that's in the Date Text format when you reopen the file. To speed things up even more, press **<Ctrl>-D** to insert the date in Date Text format.

Split the Screen to Edit a Long Document

Q I'm used to working with UNIX's Emacs editor, but when I work on a stand-alone PC, I use WordPerfect 6.1 for Windows. Emacs can split the screen and let me work on two parts of a file at the same time, updating it in both windows. Can WordPerfect do this?
Robert Y. Eng, Redlands, California

A Unfortunately, WordPerfect lacks split-screen editing. You can load two copies of the same document into different windows, but you can't save the second copy with the same file name, and changes you make in one window are not reflected in the other.

Both Microsoft Word and Lotus Word Pro (but not Ami Pro) do have split-screen editing. In Word 6.0 and 7.0, open a document, then select *Window•Split*. In Word Pro, select *View•Split Left-Right* or *View•Split Top-Bottom* (see **FIGURE 3**).

Make Lotus Word Pro Faster

Q In the May issue, you suggested several ways to speed up Word Pro. I followed your advice on my Windows 3.1 version, but it's still slow. Do you have any other tips?
Andrea Wilson, Denver

A Yes. First, Lotus has released an Update Kit for the Windows 3.*x* version of Word Pro that improves performance for launching the program and for opening and saving files. The free kit also fixes a few bugs. To get a copy, call Lotus Customer Service at 800/343-5414. Have your program disks or CD-ROM in front of you when you call. This update is not available online.

Second, you can dramatically improve the launch time for both the Windows 3.*x* and Windows 95 versions of Word Pro by reducing the number of TrueType fonts you have installed to less than 100. Be sure, though, not to delete any Arial or Times New Roman fonts, or any font that begins with the letters MS. Your system needs these fonts, and your programs may display strange characters in dialog boxes and elsewhere if you delete them.

To trim down your font list in Windows 3.1, go to the Control Panel, double-click *Fonts*, select a font you don't use, and click *Remove*. In Windows 95, double-click the *Fonts* icon in the Control Panel, right-click the font you don't want, and select *Delete* from the menu.

Finally, if you work with old Ami Pro files, your work will go faster if you convert them to Word Pro format. The File•Import command does this better than File•Open. Be sure to save the files in Word Pro format after editing.

By George Campbell

George Campbell is a contributing editor for PC World *and a contributor to* The PC Bible *(Peachpit Press, 1995, 800/283-9444).* Word Processing *welcomes your questions and tips and pays $50 for published items. See page 14 for contact information.*

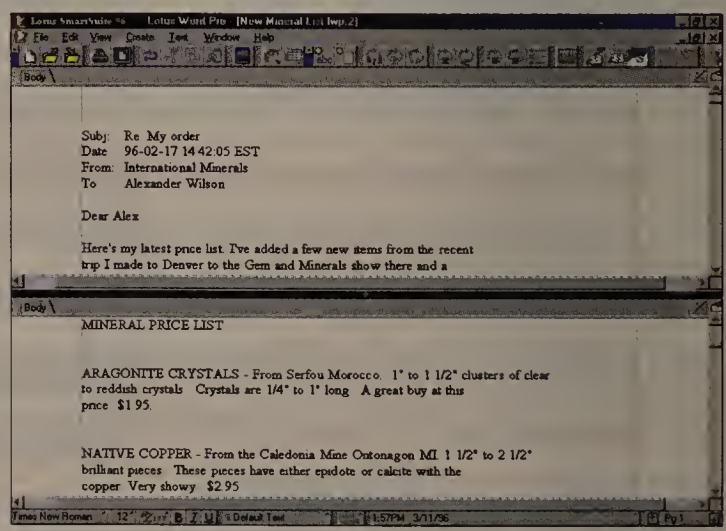

FIGURE 3: WORK ON TWO PARTS OF A LONG DOCUMENT at the same time with Word Pro's split-screen editing feature (also available in Word, but not in WordPerfect or Ami Pro).

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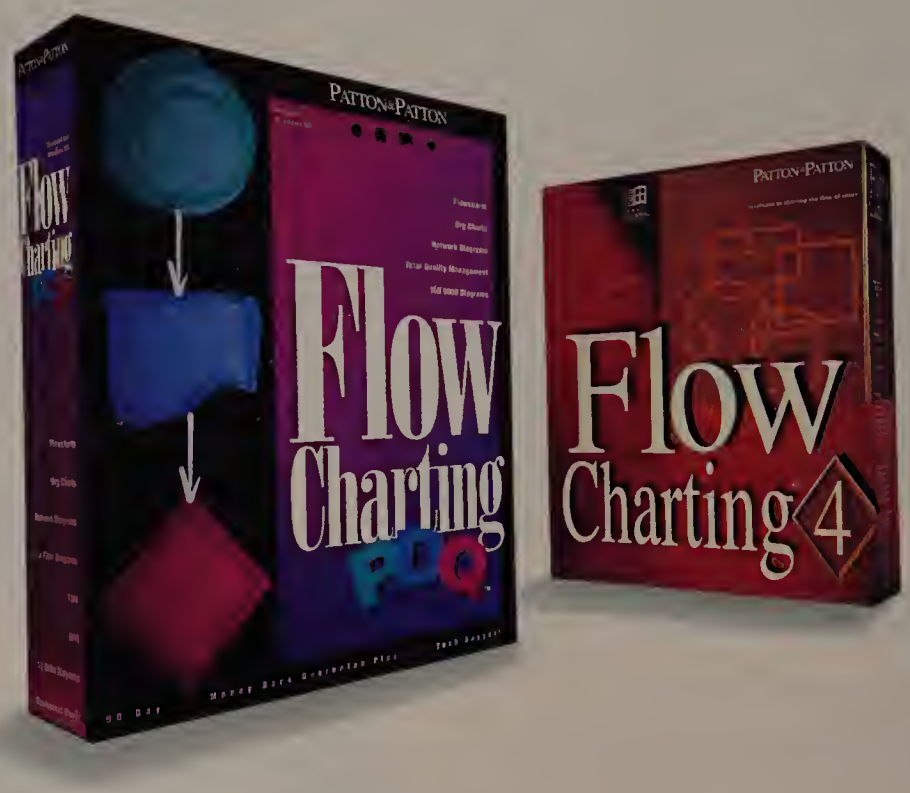

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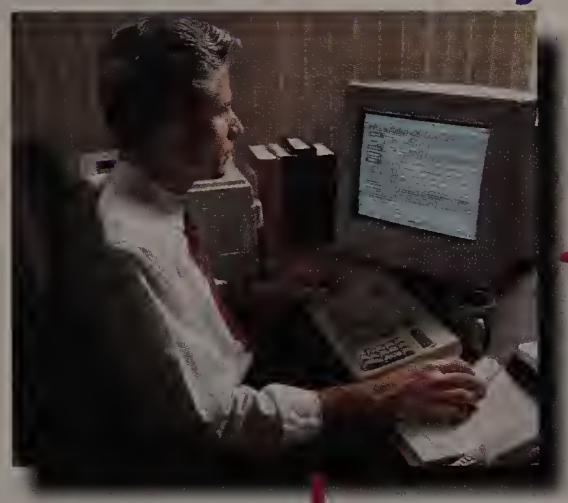

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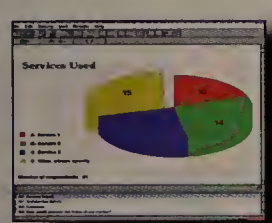

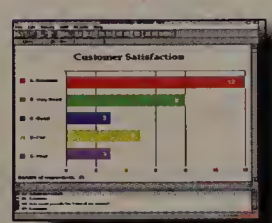

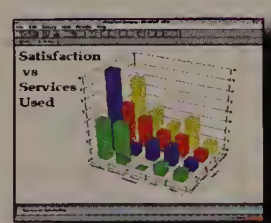

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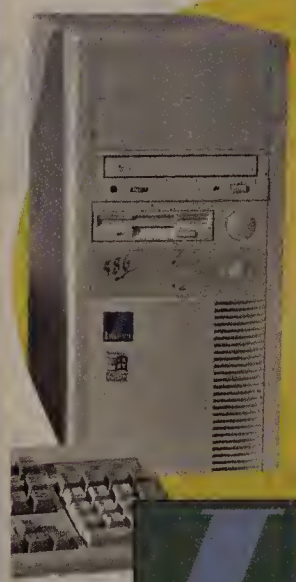

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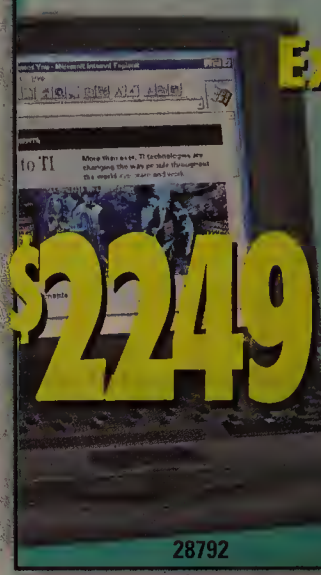

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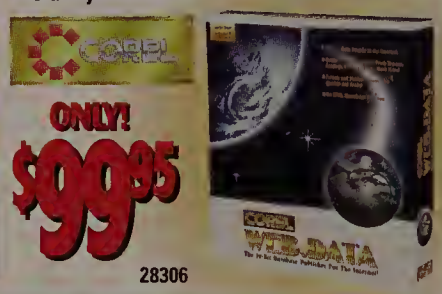

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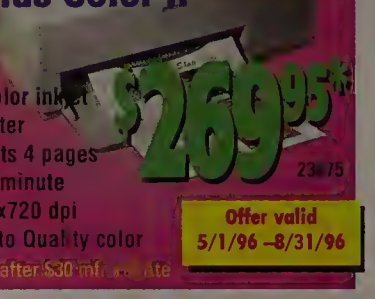

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WINDOWS Q&A

Why Don't You Do Windows (Write)?

Q I want to be able to load readme files, format them, print them with page numbers, and save them with the formatting. NotePad allows page numbering and headers but doesn't allow easy font changes and other formatting tools. I like Windows 95's WordPad a lot, but it won't let me number pages or place headers on the printed page. What should I do?
Michel Woody, Deer Park, Texas

A You just need to take a big step backward—to Windows Write. Unlike WordPad, Windows Write permits custom headers and footers complete with automatic page numbering.

If you try to launch Write in Windows 95, you'll usually get WordPad instead. So put aside WordPad by renaming its write.exe file in your Windows folder, or just chuck it. Then restore write.ex_ from your Windows 3.*x* installation disks. To do that, insert the proper floppy, open a DOS window, type **expand**, and press **<Enter>**. Then follow the prompts to restore Write.

Once you've reclaimed your Write, open a file you want to format and choose *Document•Header* or *Document•Footer*, depending on whether you want the page number to appear at the top or bottom of the page.

Type a measurement for Distance from Top (or Distance from Bottom) as in **FIGURE 1**. The header or footer uses this distance as its margin and ignores the margin settings in the Document•Page Layout dialog box (which apply only to body text). Check whether the header or footer should appear on the first page and click *Insert Page #* to add the page number symbol, which in the Write window appears as '(page)'. To add other text to the header or footer, such as the file name or the word *Page* before the page number symbol, move the cursor outside the dialog box and then type. You can format the page number with any font or alignment options you like. As soon as you're done, click *Return to Document*, then format and print, and you're set.

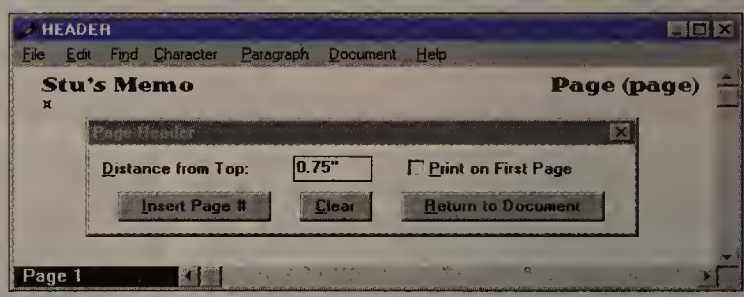


FIGURE 1: WINDOWS WRITE IS WAY AHEAD OF WORDPAD when it comes to page numbering, headers, and footers.

The Case of the Missing Windows 95 Icons

Q When I had Windows 3.1, I dressed up Program Manager with icons from the moricons.dll file in the Windows directory. Now that I have Windows 95, I can't find moricons.dll. Did Windows 95 delete it?
Milo Crandle, Los Angeles

A Not to worry. Chances are Windows is simply hiding all .dll files. If you want to see those files, you can start Windows Explorer or double-click *My Computer*. Choose *View•Options* and click the *View* tab. Click *Show all files* and then click *OK*.

If you'd prefer to leave these files hidden but still have access to them, follow the normal steps to edit an icon: Right-click a Shortcut, select *Properties*, click the *Shortcut* tab, and click *Change Icon*. But now, instead of clicking *Browse*, just type **c:\windows\moricons.dll** (your path may differ) and press **<Enter>**. Select an icon from the group (see **FIGURE 2**) and click *OK* twice. The icons will work as usual, even though moricons.dll remains hidden from Explorer and Browse dialog boxes.

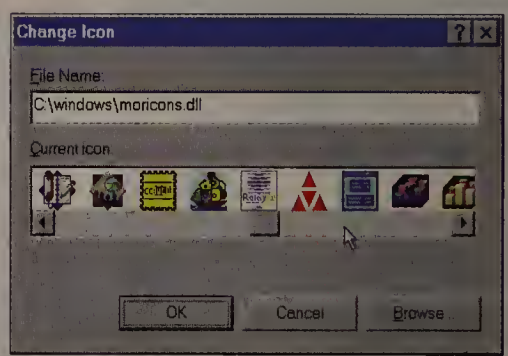
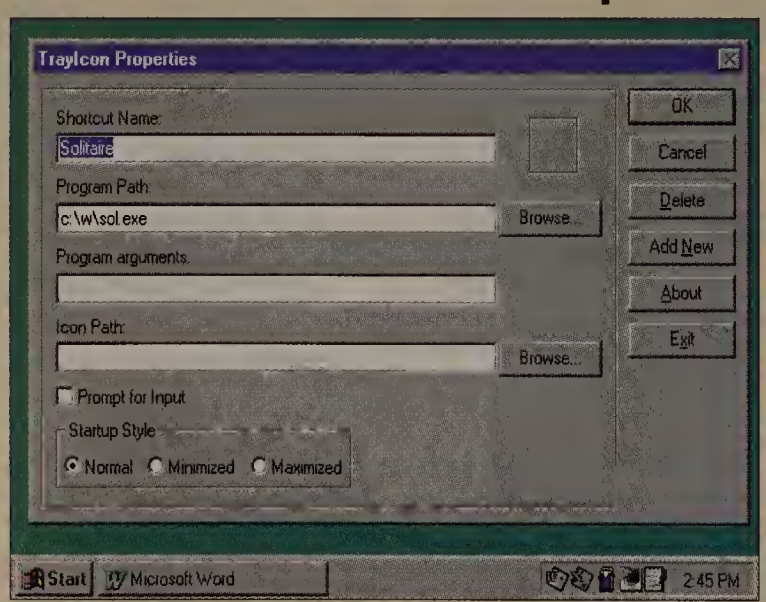


FIGURE 2: FIND ICONS for your Windows 95 Shortcuts in the moricons.dll file.

Windows Toolbox: Click It Up



Want a utility that can launch all your favorite applications and documents in a single click? TrayIcon lets you put Shortcuts in the "tray" (the area of the Taskbar at the opposite end from the Start button) for one-click access. You can customize the icon and designate whether a program should start minimized, maximized, or at normal size. You can have your application prompt you for command-line parameters when you launch it. Registration is a mere $5. TrayIcon is the work of Brian P. McCarty, 75121.2130@compuserve.com. It's available on PC World Online as trayicon.zip.

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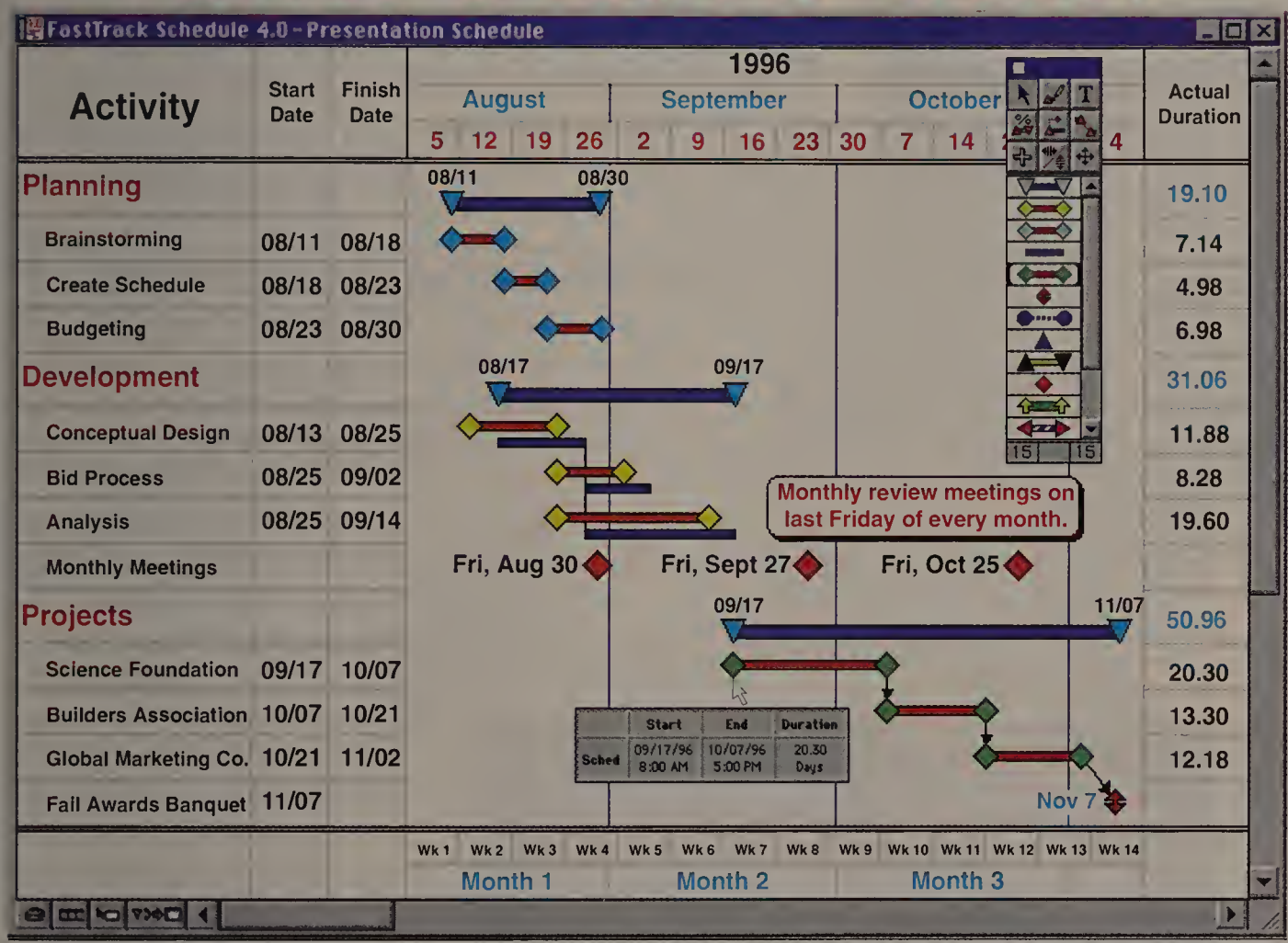

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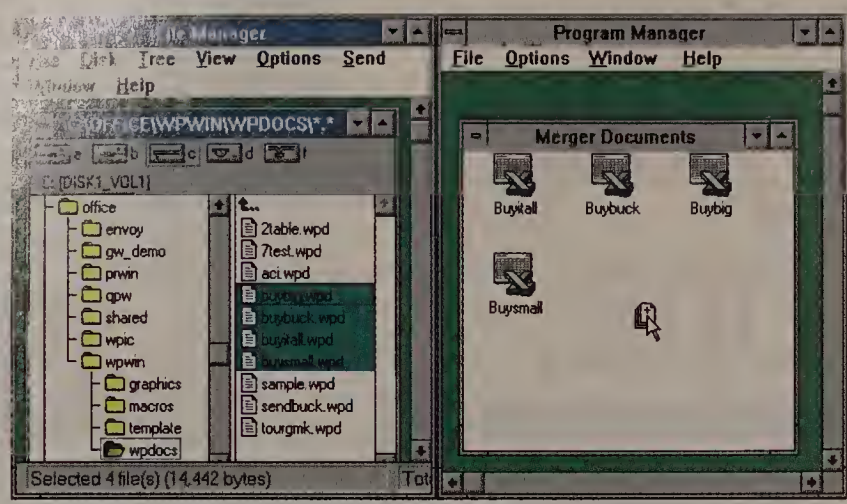

FIGURE 3: CREATE DOCUMENT ICONS in Windows 3.x by dragging and dropping documents into the proper Program Manager group.

Quick Icons for Program Manager

Q I am a Windows 3.1 user and like to have document icons in a Program Manager group so that I can open any of my documents with a double-click. But I don't like to have to create icons one by one, typing in file name after file name (or browsing through a directory tree). Can Windows automatically set up an icon for all of my documents?

Greg Slade, Detroit

A Some word processors contain macros that can add icons for their documents to Program Manager, but the fastest way to do this for any application is with a little drag and drop—and this also lets you create multiple icons in a single bound.

Here's what to do: Open File Manager and arrange things so that Program Manager and File Manager are side by side. The quickest way to get there is to minimize all other windows, then press **<Ctrl>-<Esc>** and click *Tile*. In Program Manager, open the group in which you want to add the icons. In File Manager, open the directory where you keep your documents. Then select all the documents you want and drag them to the Program Manager group. Voilà—instant icons! (See **FIGURE 3**.) If you later delete a document, remember to delete its Program Manager icon, too.

The Mystery of the Dead Ringer in Windows 3.x

Q Ever since I installed a new 14.4-kbps modem, when I start Windows 3.1 I get the following message on a blue screen, after the logo screen but before Windows loads: 'Ring 0 Systems. Virtual 16550 Driver Board was not found in your computer! Virtual 16550 and communication buffering in the DOS box will not work. It may cause lost bytes during the data transfer or any other problems with communication software running under V86 DOS. Press any key to continue.' When I press a key, Windows starts. What does this message mean, and how can I get rid of it?

Steven Shagrin, America Online

A This message occurs when you remove a modem or move it to a different serial port without removing or reconfiguring a Digicom Systems Inc. driver. This pop- ▶

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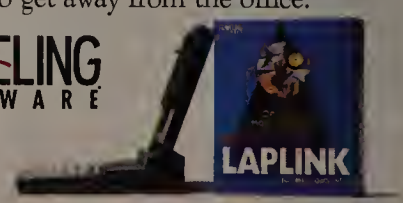

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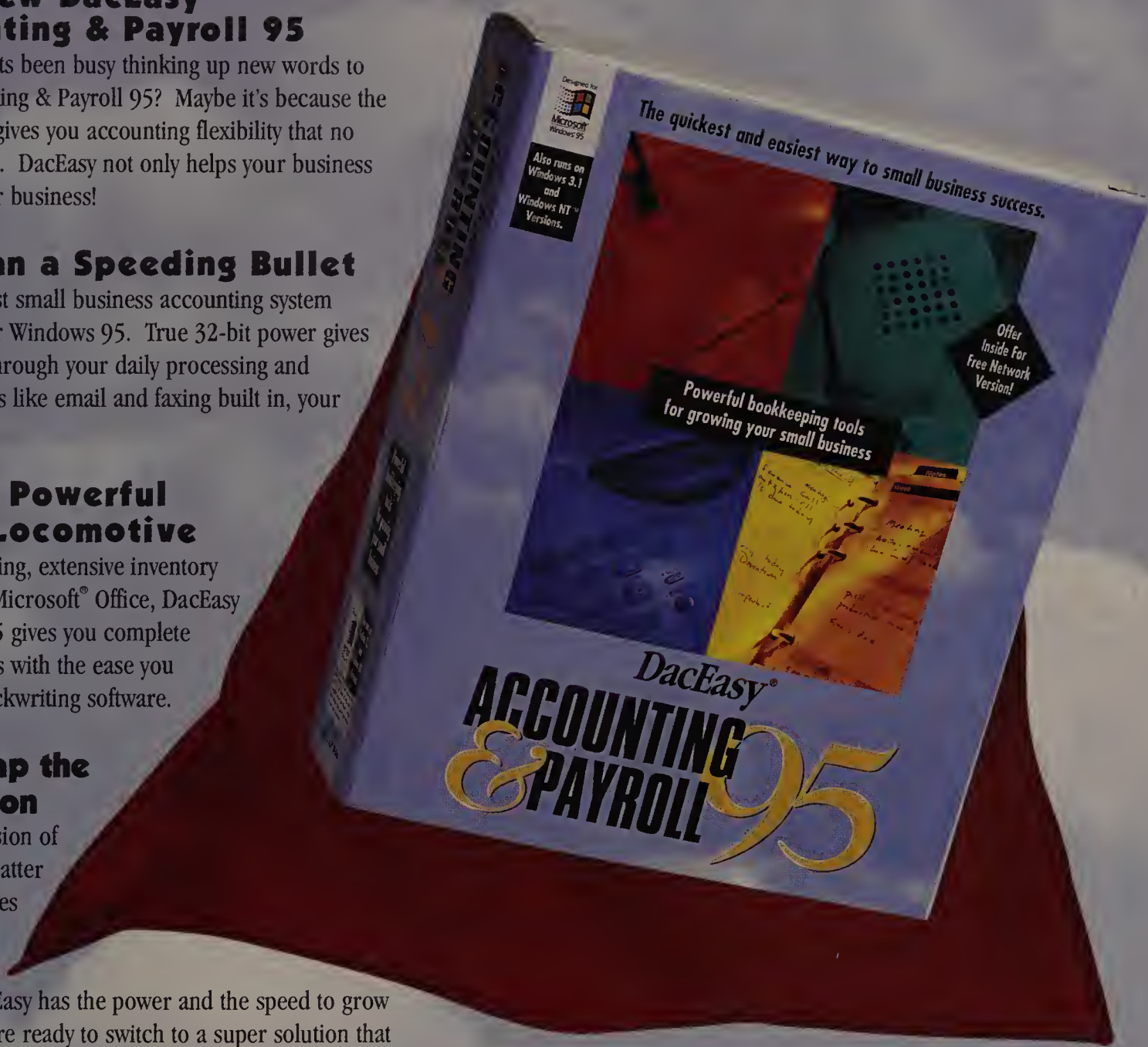

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ular driver replaces comm.drv, Windows' default serial communications driver, and causes the error message when it can't find the modem on the expected port.

If both your new and old modems used a DSI driver, you can run the dsi.exe utility that came with your modem to reconfigure it to the new serial port.

On the other hand, if you're certain your new modem does not use the DSI driver (r0dsicom.drv), you'll have to uninstall it. To do that, first make a backup of the system.ini file in the Windows directory in case anything goes wrong. In File Manager or Program Manager, choose *File•Run*, type **system.ini**, and click *OK* or press **<Enter>**. Under the [boot] heading, look for a line that says 'comm.drv=r0dsicom.drv' and modify it to read **comm.drv=comm.drv**. Next, find the [386Enh] heading, and underneath it look for these three lines:

device= r0dsivcd.386
device= r0dsibuf.386
device= r0dsimgr.386

Delete these lines or (if that makes you nervous) disable them by typing a semicolon to the left of each. Then add two new lines, **device=*vcd** and **device=*combuff.** Save system.ini and restart Windows. The error message should not reoccur.

The above steps assume you'll be using the Windows default communications driver. If, however, your new modem does not use that driver, you may need to run its installation program again. For more information, contact your modem's manufacturer or Digicom Systems at 408/262-1277.

Make a Floppy Garbage Bin

Q How do I set up the Recycle Bin so that it stores stuff that I delete from my floppy disk drives?
Balasingam-Chow Yu Hui, Internet

A Unfortunately, the Recycle Bin doesn't store material from your floppy disks. However, you can make a separate folder that does the job.

First, in My Computer or Explorer find a good place on your hard drive to store these files. Open that parent folder, and in its window right-click an empty area and choose *New•Folder*. Name this new folder **Floppy Garbage Bin** or some other descriptive title. Use the right mouse button to drag the new folder to your desktop, and choose *Create Shortcut(s) Here*. To customize its look, right-click the Shortcut and choose *Properties*. Click the *Shortcut* tab and then click *Change Icon*. Scroll through the available icons and select something appropriate. Click *OK* to close the dialog box, and click *OK* again to close the Properties sheet.

Now when you open a window to a floppy, press **<Shift>** and drag the files you don't want to the new Floppy Garbage Bin Shortcut (or right-drag them and choose *Move Here*). Since this "recycle bin" won't delete items automatically, remember to open it occasionally and purge the files.

Screen Saver Cleanup in Windows for Workgroups

Q I installed a screen saver into Windows for Workgroups 3.11, then deleted the program—but the screen saver's name still appears in the list when I double-click ▶

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Analog can slow you down, but ISDN hardware is a far cry from your reliable 28.8 modem. What are the pitfalls and promises of ISDN?

Online Services: Beyond the Net

We check out America Online, CompuServe, and Prodigy. Which works best for e-mail, chat, forums, Web browsing, and your budget?

Also Next Month

- ▶ **The PC World Top 20 Power Desktops, Budget Desktops, and Notebooks, Plus the PC World Top 10 Personal Printers, 15-Inch Monitors, Graphics Boards, and Modems**
- ▶ **Online Rights: What's legal, from copyright to Netiquette**
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PC WORLD

The New Casio Digital Camera.
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the Desktop icon in the Control Panel. I have looked in the *.ini files and find no reference to the program anywhere. Can you tell me how to delete this screen saver name?
Bob Cruthirds, Internet

A You must delete the most important component of the screen saver, the .scr file. Both Windows 3.*x* and Windows 95 store .scr files in the System directory (or in some cases the Windows directory). Remove the appropriate file with the .scr extension and you'll eliminate its presence in Control Panel's Desktop listing (in Windows 3.*x*) or the Display Properties sheet (in Windows 95).

A Printing Primer for Windows 95

Here are six super tips for quick and efficient printing in Windows 95.

View the queue. Wondering why your file is taking so long to print? Open up the Printers window by choosing *Start • Settings • Printers*. Then double-click on the appropriate printer icon.

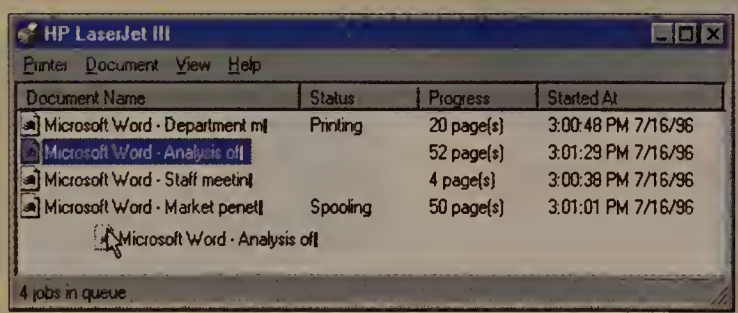
Boss those jobs around. If you enjoy the proper network privileges, you can change the print order of each item in the print queue by selecting it and dragging it up or down. To cancel or pause all print jobs, choose either *Printer • Purge Print Jobs* or *Printer • Pause Printing*, respectively. To cancel or pause one print job, select it and choose either *Document • Cancel Printing* or *Document • Pause Printing*, as appropriate.

Three ways to set it. You adjust a printer's settings through its Properties sheet. In the Printers window, select a printer and choose *File • Properties*, or right-click the printer and choose *Properties*. If you're in the queue window (see the tip above), you can also choose *Printer • Properties*.

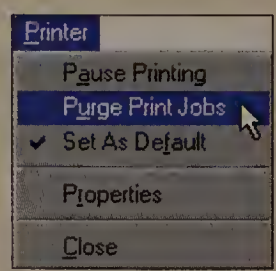
Get your priorities straight. What do you want—faster output or a faster return to your application? You decide: In the Properties sheet, click *Details* and then *Spool Settings*. The first and second options get you back to work fastest but sacrifice hard disk space; the first and third options save a little on disk space. The fourth option (not available for shared printers) uses no disk space and offers faster output—but makes you wait longest to return to work.

Drag and drop and print. You don't have to open a document to print it. Put a Shortcut to a printer in a convenient place (like the Windows desktop) by selecting a printer in the Printers window and then using the right mouse button to drag and drop it where you want. Choose *Create Shortcut(s) Here*, then drop the files you want to print onto the Shortcut.

Send it printing. If your desktop is already too messy or too covered by windows for drag-and-drop printing, move that printer Shortcut to c:\windows\sendto (your path may differ). To print, just click on a file with the right mouse button and choose *Send To* [printer name].



CHANGE THE ORDER OF JOBS in the print queue menu...



...OR DELETE ALL PRINT JOBS from the queue.

DOUG ROSS

Restore the Font Viewer in Windows 95

Q Before I installed Windows 95, I was using a third-party font manager (Font Monster) to manage my TrueType fonts. I chose to delete this program before I installed Windows 95. However, because Windows 95 assumes this program is still available, I've lost my ability to view TrueType fonts. Whenever I double-click on a TrueType font, I get a dialog box asking for the location of the old font manager. How can I reconfigure my system to fix this?
John Fox, Indianapolis

A TrueType's .ttf file extension is associated with your old font utility. All you have to do is change that association to Windows 95's font viewer.

In Explorer or My Computer choose *View • Options*. Click the *File Types* tab. Scroll through the list until you find the TrueType Font file type. Select it and click *Edit*. In the Actions list, select *open* and click *Edit*. In the 'Application used to perform action' box, change the path to read **c:\windows\fontview.exe** (your path may differ) and click *OK*. Then select the *print* action and click *Edit*. Change its application path to **c:\windows\fontview.exe /p** (again, your path may differ). Then click *OK* and close all dialog boxes. Now when you double-click a TrueType font file, you'll see the font viewer and the type sample.

By Scott Dunn

PC WORLD online *The files from this article are available on PC World Online. Scott Dunn is a contributing editor for* PC World *and a principal author of the* PC Bible, 2nd Edition *(Peachpit Press, 1995, 800/283-9444).* Windows *welcomes your questions and pays $50 for published items. See page 14 for contact information.*

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Dell's featured computer artist is Marco Marinucci of San Francisco, CA.

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DATA MANAGEMENT Q&A

Automatically Load Files and Forms

Q I use Access to set up databases for various departments. For most projects, I create a "switchboard" form like the one in the sample databases. I'd like Access to open each person's database and the switchboard automatically when the application is loaded. Can I do this without programming?
Cliff Berg, New York

A Yes and no. If you're using Windows 95, the easiest way to have your program—Access, Approach, or Paradox—automatically open a specific database is to create a Shortcut to it.

Open the Windows 95 Explorer window and bring the name of the database file you want to open into view in the right side of the window. Right-click the file name and choose *Create Shortcut*. When the Shortcut appears in the Explorer window, drag it onto the Start button or onto the desktop. When a user double-clicks the Shortcut, the database program will start and automatically open the database file.

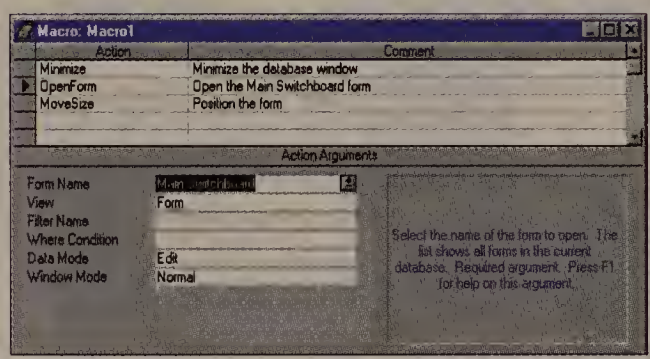

FIGURE 1: AN AUTOEXEC MACRO can tell Access to automatically open a specific form when it starts.

If you're working in Windows 3.*x*, just add the name and path of the file you want to open to the command line that starts Access, Approach, or Paradox. In Program Manager, highlight the program's icon in its program group window and choose *File•Properties*. Click in the Command Line box, press **<End>** to go to the end of the line, press **<Space>**, and add the path to the file. The command line for loading a database file into Access 2.0 might look like this: c:\access\msaccess.exe c:\forecast\payroll.mdb.

The second part of your request, automatically opening a form when a database opens, requires a few simple macro commands in Access and Approach, but not in Paradox. Paradox saves forms and other objects as separate files, so you can load them directly from Windows. I'll describe how to open forms, objects, and views automatically in all three programs.

Access: To open a specific form (or table, module, query, or report) automatically when Access loads, create an AutoExec macro that runs automatically when you open a database.

Go to the Database window, click the *Macros* tab, click *New*, and add an OpenForm action as in **FIGURE 1**. (The optional MoveSize action in the figure opens the form in a fixed position.) When you close the Macro window, save it with the name autoexec.

Approach: To tell Approach to switch to a particular view when a database is opened, create a macro called open. Select *Edit•Macros*, click *New*, and add a View command as in **FIGURE 2**.

Paradox: When you load Paradox, it usually opens any forms or other objects that were open when you last exited the program. It also remembers what working directory you were using. But to make sure Paradox opens to a specific working directory and object, create a Windows 95 Shortcut directly to the object instead of the program, or add the object's path and name to Windows 3.1's Command Line.

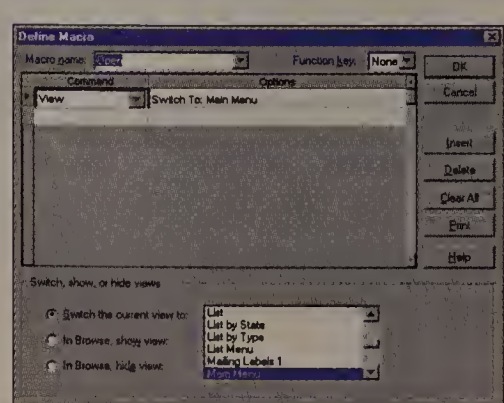

FIGURE 2: AN OPEN MACRO can tell Approach to open a specific form or view when the program starts.

If you already have a Paradox Shortcut on your Win 95 desktop, change its properties so it switches to the correct working directory and opens an object.

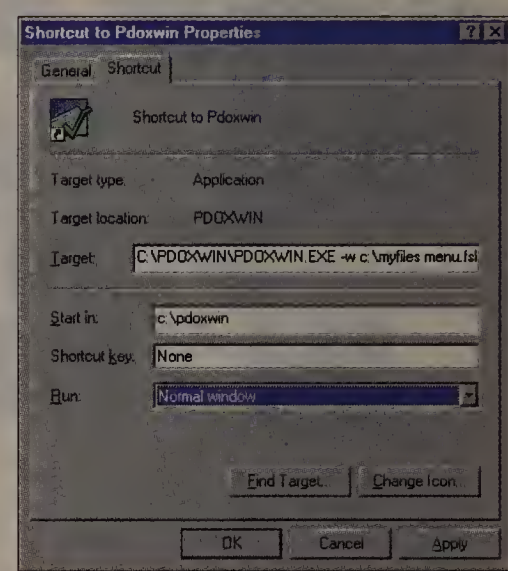

FIGURE 3: PARADOX FORMS AND OBJECTS can be opened directly from the desktop with a Win 95 Shortcut.

Right-click the Shortcut and choose *Properties*. Click the *Shortcut* tab in the Shortcut dialog box, and in the Target box press **<Space>** and add **-w c:\myfiles menu.fsl**, or the names of your working directory and form, as in **FIGURE 3**.

If the Shortcut is on the Start menu, right-click the Taskbar background, choose *Properties*, click the *Start Menu Programs* tab, click *Advanced*, right-click the Paradox Shortcut, and choose *Properties*. Click the *Shortcut* tab, and in the Target box press **<Space>** and add **-w c:\myfiles menu.fsl**, or the names of your working directory and form.

By Celeste Robinson

Celeste Robinson is a contributing editor for PC World *and the coauthor of* Mastering Paradox 7 for Windows 95 *(Sybex, 1996, 800/227-2346).* Data Management *welcomes your questions and pays $50 for published items. See page 14 for contact information.*

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ONLINE Q&A

Using Navigator With America Online

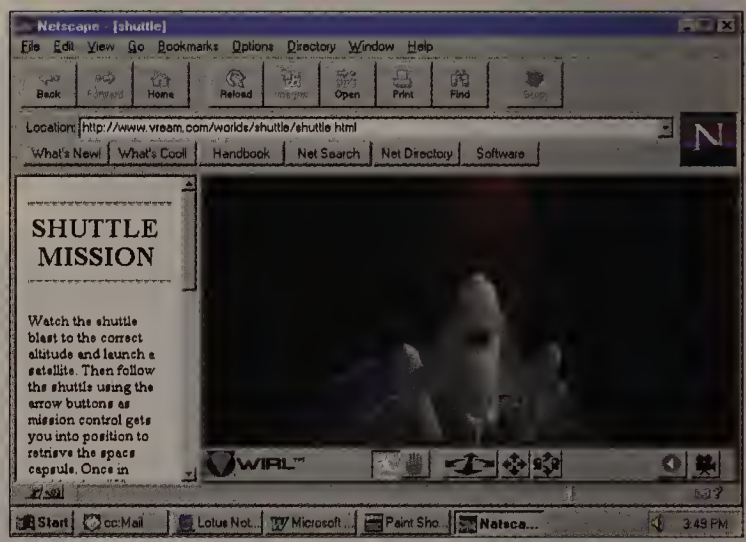
Q I've heard that one can use Netscape Navigator with America Online, avoiding AOL's clunky Web browser. How does this work?
Andre Clark, Trenton

A In theory it's easy. You simply log on to America Online, and instead of heading to the Internet Connection box and clicking AOL's Web browser, you fire up the superior Navigator.

But there are caveats. At this writing AOL doesn't work with the Windows 95 version of Navigator. AOL recommends downloading the 16-bit version from AOL (keyword netscape).

You'll also need to download AOL's 16-bit version of Winsock to work with Navigator (keyword winsock). Finally, you might want to read "Avoid Clashing Winsocks" in April's *Online Q&A* for tips on getting AOL's Winsock to cohabit peacefully with other versions of Winsock you might have installed.

At press time, America Online had signed agreements with Netscape to license Navigator, and with Microsoft to license its Internet Explorer browser (which will be built into the AOL software). Users can download Netscape Navigator and install it themselves. And Navigator 2.0 will be the default browser for America Online's GNN Internet service.



PLAYING 3-D GAMES ON THE WEB is about to become reality with VRML browser plug-ins.

Virtual Reality on the World Wide Web

Q I've been hearing a lot lately about virtual reality coming to the Internet. What is it? And how do I add virtual reality to my Web browser?
Peter Longstan, Baltimore

A Virtual reality on the Internet refers to the ability to see objects on Web pages in three dimensions. You can view the objects from different angles as well as move and interact with them, just as you do in a video game.

Sounds great, doesn't it? But as with most things computer, warring standards plague this emerging technology. As we go to press, Microsoft is pushing its Active VRML (Virtual Reality Markup Language) specifications. And meanwhile, Netscape and Silicon Graphics are lining up developers to support the Moving Worlds standard. I think the Netscape contingent will win.

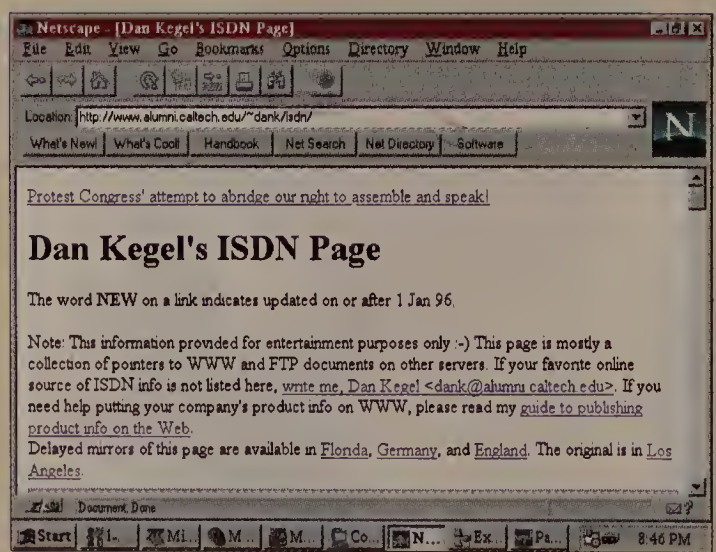
To add VRML ability to Netscape Navigator 2.0, just download one of the many 3-D plug-ins available from the company's Inline Plug-ins page (http://home.netscape.com/comprod/products/navigator/version_2.0/plugins/index.html). These plug-ins pretty much set themselves up, and unlike add-ons of yore, they require no tinkering.

Netscape's own browser plug-in is called Live3D, but my favorite is WIRL from VREAM (see the figure above). It supports sound and gives objects unique visual properties such as elasticity. You can download the beta 1 release of WIRL for free from the company's home page (http://www.vream.com/), or order the $29 commercial version from VREAM.

If you run Internet Explorer, head to the Microsoft VRML Add-In page (http://www.microsoft.com/windows/ie/vrml.htm) to download the company's VRML add-in. All the online services are investigating ways to support VRML, by licensing add-ins or building it into their own browsers.

- **WIRL** $29; VREAM; 312/477-0425; http://www.vream.com/
  Reader service no. 677

Online Project: ISDN, but When?



If you're itching to upgrade to an ISDN line in either your home or your business, head to Dan Kegel's ISDN Page (http://www.alumni.caltech.edu/~dank/isdn/). It offers links to everything on the Net related to these superfast phone lines, even ISDN-related humor.

Getting Fast Connections on the Internet

Q Could you enlighten me on the factors affecting modem throughput on the Internet? What can I do to pinpoint bottlenecks and correct them?
Robert F. Decker, Dutton, Virginia

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Speed Up Internet Connections

Modem

1. Make sure a 16550A or 16550AF UART chip is built into your modem or PC.
2. Get the latest software or the latest chip for your modem.
3. Boost your communications software's speed to 115.2 kbps for a 28.8-kbps modem.
4. Download Trumpet Winsock.

Phone

1. Ask your phone company to remove repeaters from your phone line.
2. Ask your phone company if you can bypass multiplexers.

Internet service provider

1. Use the same brand of modem it uses.
2. Find an ISP that connects to the Internet via a T1 or T2 line.
3. Find an ISP that runs off a giant UNIX box, with enough hardware capacity that it won't get overloaded and slow everyone down.

Internet

1. Download large files at off-peak times.
2. Download files from mirror sites geographically closest to you.

A Too bad there's no traffic helicopter hovering over the I-way, broadcasting locations of jam-ups. Many factors affect your speed on the Internet: the pace at which your modem and PC communicate, the condition of the phone line, and your Internet service provider's equipment and setup. Then there's the Net itself and all its whims.

Let's start with your modem. If you're using an internal modem, it should have a 16550A or 16550AF UART chip—not a "faux," "virtual," or "simulated" one, but a real one. If your modem is external, your PC should have this chip built in. (Run the MSD utility found in either your DOS or Windows directory to see if it is.) Low connect rates can also result from an outdated modem. Check with the manufacturer to make sure your modem has the latest software, or the latest chip if the modem accepts hardware upgrades. If you're using a 28.8-kbps modem, boost your communications software's speed to 115.2 kbps.

Some users report that certain Winsocks are slow; for top speed, download Trumpet Winsock from the company's Web site (http://www.trumpet.com.au/wsk/winsock.htm).

Phone lines are another cause of slowdowns. Many suburban and rural users find their local phone line the source of woe. The modem connects at a brisk 28.8-kbps clip in the city but slows to a crawl in the provinces. Test your modem in different locations to pinpoint the problem.

If you suspect that phone lines are the culprit, call a local computer store and ask to test different brands of high-speed modems on your line. Brands vary markedly in their ability to handle suburban and rural phone lines. You should also ask your phone company to remove any *repeaters* from your lines. (Repeaters boost a signal over long distances, sometimes adding distortion.) Find out if your phone calls are being funneled through a *multiplexer*, which allows two or more signals to pass over one line—another cause of modem signal distortion. If so, ask the company whether you can get a direct line into the switching office and bypass the multiplexer. You may have to whine a lot to get these things done.

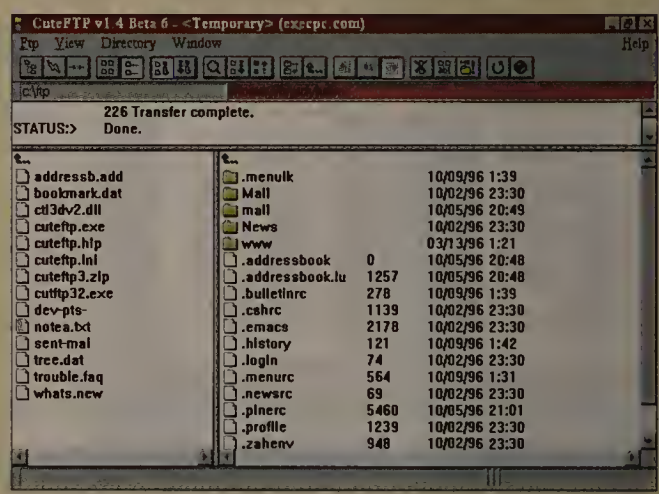
Next there's your Internet service provider. Many people suggest using the same brand of modem your ISP uses so that data compression between the modems can work at top efficiency. But a lot depends on how your ISP connects to the Net, at what speed, and with what type of hardware. Ideally, the provider should connect directly into the Internet backbone at T1 or T2 speed, and it should have a server powerful enough to handle its callers without becoming overloaded. Of course, if you're connecting via a commercial service such as America Online, CompuServe, or Prodigy, you'll just have to be patient. Connecting to the Internet via these services is like riding a slow bus up a steep hill.

On the Internet itself, increasing traffic means slowdowns at peak times and occasional "brownouts"; in the university town where I live, Internet access creeps during exams. Try downloading large files only in the wee hours of the morning. Overload can also slow down popular shareware servers. If a program you're looking for is available on mirror sites (FTP sites that regularly copy files from a main site), head to the one that's geographically nearest you.

By Judy Heim

Judy Heim is a contributing editor for PC World *and author of* Internet for Cats *(No Starch Press, 1995, 800/420-7240).* Online *welcomes questions and tips and pays $50 for published items.* *See page 14 for contact information.*

Online Toolbox: Get Cute With FTP



For Windows 95 users, one of the best FTP programs around is a little $30 shareware gem called CuteFTP. It gives you FTP capabilities without making you learn the details of the protocol. Modeled after Windows' File Manager, it's ideal for uploading files to your World Wide Web site. You can download either the 32-bit or 16-bit version from the CuteFTP Web site (http://papa.indstate.edu:8888/CuteFTP/).

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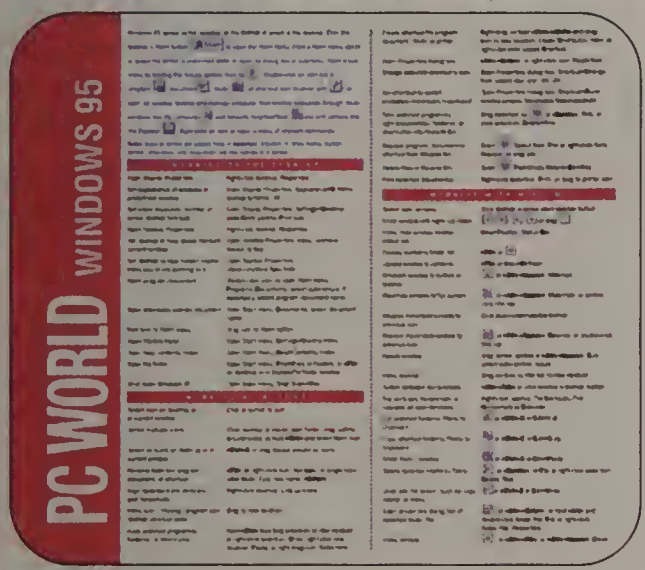

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HARDWARE Q&A

Getting the Best PC Price/Performance

Q I recently purchased a Pentium-166 system. To say I'm disappointed with its performance is an understatement. How much faster should my P-166 be than a P-133 or a P-100?
Steve Smith,
State College, Pennsylvania

A Now there's a loaded question! All things but the CPU being equal, you can expect a real-world performance difference of around 20 percent between a Pentium-100 and a Pentium-166 system. That's a far cry from the two-thirds difference suggested by the numbers, isn't it?

Your question exposes the misleading way in which systems are marketed—by the internal processing speed of the CPU, normally featured in the model number, as in "P133." In addition to the CPU's internal processing speed, another speed has a big impact on your computer's performance: the external bus speed, also called the motherboard speed; the bus lopes along at 50, 60, or 66 MHz.

For fast processing, all current Pentiums chips multiply the bus speed: A Pentium-133, for example, doubles its 66-MHz bus speed, just like the DX2-66 clock doubler of yore doubled a 33-MHz bus speed. However, in both cases, only the instructions and data in the CPU's cache are processed at the faster internal processing speed. When the chip refills the cache or writes to memory, it bumps down to bus speed or slower. Instead of doubling system performance, running the CPU at double the bus speed gives you between 30 and 70 percent swifter performance.

Pentium chips don't just double or triple the clock, as 486DX2s and DX4s did; they may also multiply the bus speed by a fraction. This creates baby steps on the performance ladder—steps for which system vendors charge a premium (see **FIGURE 1**). For example, the Pentium-166 multiplies 66 MHz by 2.5, resulting in a barely noticeable performance advantage over the clock-doubling P-133, even though the system price difference hovers around $400 at this writing. Take an identically configured P-133 and P-150, and price aside, I defy you to tell the difference. The latter's slower 60-MHz bus speed makes its performance virtually indistinguishable from that of the former.

You always pay a premium for the best performance, but with Pentium-class systems, that premium buys you less. So where's the sweet spot? That changes from month to month, but there are three rules that won't change anytime soon; they apply also to systems with Pentium clones.

Let's see how you did with your Pentium-166:

• *Buy a computer with a 66-MHz bus.* Score one for you: Your Pentium-166, like Pentium-100s and -133s, has a 66-MHz bus. Pentium-90s, -120s, and -150s all have 60-MHz buses. That 6-MHz deficit also causes the PCI bus to run at 30 MHz instead of its optimum 33 MHz, which is another reason Pentium-150s average only a few points faster than P-133s. The slow 50-MHz buses in Pentium-75 systems, now obsolete, actually caused those systems to run slower on average than Pentium-66s.

• *Look for CPUs that multiply the bus speed by whole numbers.* You lost here. Your CPU multiplies the bus speed by 2.5, so the synchronization between internal CPU processing and the bus isn't as clean as with whole-number multipliers—one reason the P-166s we've tested average only 8 percent faster than P-133s, which multiply by 2. By the same token, the P-133s average a solid 15 percent faster than P-100s, which multiply by a wimpy 1.5. Pentium-133s are the best buys at this writing: For example, Dell was selling a P-133 for only $20 more than a P-100 in an identical configuration.

• *Buy one or two steps back from the cutting edge.* You get half a point here. Although you bought the fastest Pentium available and paid for the privilege, you avoided buying a Pentium Pro, which would have been much more expensive and not necessarily faster (see "From 586 to Pentium Pro: Choosing Your Dream PC," February). By the time you read this, Pentium-200 PCs may be shipping (see "Pen-

Pentium Performance From Top to Bottom

CPU class (Internal processing speed)	System performance advantage over previous class	System performance advantage over Pentium-60	System bus speed	CPU speed as multiple of bus speed
Pentium-166	2%	59%	66 MHz	2.5
Pentium-150	6%	56%	60 MHz	2.5
Pentium-133	5%	48%	66 MHz	2
Pentium-120	10%	41%	60 MHz	2
Pentium-100	6%	14%	66 MHz	1.5
Pentium-90	8%	21%	60 MHz	1.5
Pentium-75	−1%	12%	50 MHz	1.5
Pentium-66	14%	14%	66 MHz	1
Pentium-60	–	–	60 MHz	1

FIGURE 1: DON'T PAY TOO MUCH FOR A SMALL PERFORMANCE BOOST when you buy a PC, since the rungs are close together on the ladder of Pentium systems. These figures are rough averages based on benchmark results for dozens of systems tested with 16MB of memory.

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tium-200: Winner by a Hair," *Top of the News*). These systems and increasing competition from Pentium clones will drive down the cost of P-166s.

Anyone shopping for a fast system should remember that the CPU isn't everything. Make sure you have at least 16MB of RAM if you plan to run Windows 95. Opt for 16MB of EDO RAM, and you'll get a slight speed advantage over ordinary RAM. Most important, make sure your system has at least 256K of secondary cache (pipeline-burst or SyncBurst cache is best). By the time you read this, you should be able to buy a Pentium system that uses Intel's new 430HX chip set (the group of satellite chips on the motherboard that supports the CPU). Systems with the 430HX chip set will likely set Pentium performance records, running up to 10 percent faster than systems with today's Triton chip set.

A fast hard disk can also increase performance, although differences among contemporary makes and models are generally slight (see "A Gigabyte Drive for $199?" in May). You'll also find that current graphics cards deliver very similar performance in most applications; *PC World*'s Top 10 Graphics Boards lists some of the fastest.

The bottom line is the actual performance. With such little difference in the average performance of each Pentium class, it's easy to find individual systems that perform like systems in other classes. For example, we've tested Pentium-166s that were slower than Pentium-133s because of outdated hard disks, quirky BIOSes, and other peculiarities. If you're looking for the most PC for your money, keep an eye on *PC World*'s Top 20 charts, where each PC receives a performance rating based on tests with real applications.

A New Twist for Old Hard Disks

Q In your March 1996 column, you suggested unsticking a hard disk by rapping it with the butt of a screwdriver ["Hard Disk CPR"]. I suggest a more reliable and much safer method.

The problem is not likely to be the head sticking to the platter, but rather the drive shaft sticking to its bearings. The bearings are lubricated, and the lubricant can become sticky over time, until the drive motor doesn't generate enough starting torque to overcome this adhesion. The problem is referred to as "stiction" and was common with early 3½-inch disk drives.

The cure is to remove the drive from the case and grasp it across the broad surface, with your wrist axis perpendicular to the drive (in the same axis as the drive's spindle). Then twist your wrist quickly several times (see the figure below). The mass of the platter will resist the twist, usually enough to free the shaft. This method is safer than tapping the drive because it does not force the head against the platter. And it's more reliable because it attacks the real problem—the adhesion of the drive shaft to the bearings.

Robert Krawitz, Internet

A Thanks for the great description! What I suggested came from technical support for a particular hard drive, but your advice is well taken, and should be tried before resorting to my more violent method.

Sweeping Disk Manager Under Windows 95

Q I read with interest the item in February's column about removing Disk Manager, the utility that remaps your hard disk ["Giving Disk Manager the Boot"]. After following your instructions and entering fdisk /mbr, I ran into trouble with Windows 95. I called Microsoft, and they said that once you rewrite the master boot record, as the command you listed does, you have to reinstall Windows 95.

Tom Norwood, Chandler, Arizona

A You're right and I apologize—I neglected to give specific instructions for Windows 95.

Let's review: First, you back up your hard disk, because all its data will be destroyed. To get rid of Disk Manager, you need to copy fdisk.exe to a boot floppy, boot from drive A:, and enter **fdisk /mbr**, which overwrites the master boot record on your hard disk. But if you're a Windows 95 user, you need to make sure you have a Windows 95 boot disk in your A: drive, not a DOS boot disk. Then you run fdisk and partition your hard disk as desired.

If you use a DOS boot disk, as you did, when you restore your data from your backup to the hard disk, all your data will be intact—but you'll boot to DOS. As you discovered, the only way to get your system to boot from Windows 95 again is to reinstall Windows 95 from scratch.

By Eric Knorr

Eric Knorr is a contributing editor for PC World *and editor and principal author of* The PC Bible *(Peachpit Press, 1995, 800/283-9444).* Hardware *welcomes your questions and pays $50 for published items. See page 14 for contact information.*

Unsticking a Frozen Hard Drive

IF YOUR HARD DISK WON'T BOOT but your drive light stays lit, the problem may be a frozen drive spindle. Rather than whacking the drive with a screwdriver, try giving it a hard twist of the wrist to free it up.

1 Take out the drive and grasp it with your hand flat and your wrist perpendicular to the drive, on the same axis as the spindle.

2 Rotate the drive abruptly back and forth a few times, as if turning a dial.

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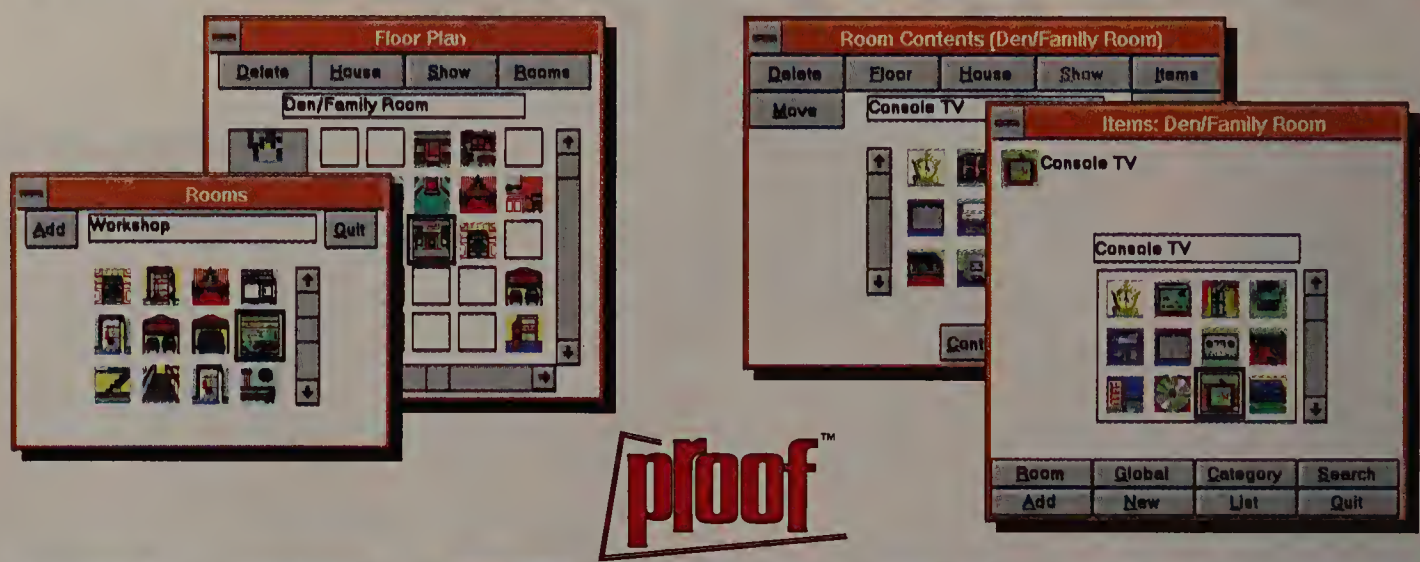

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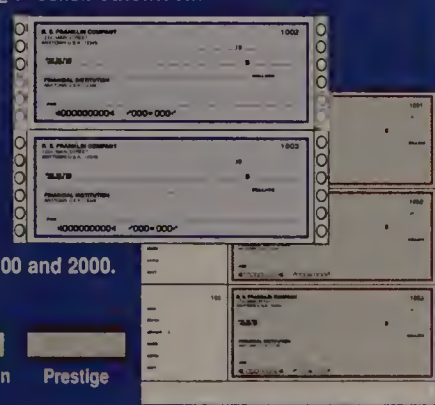

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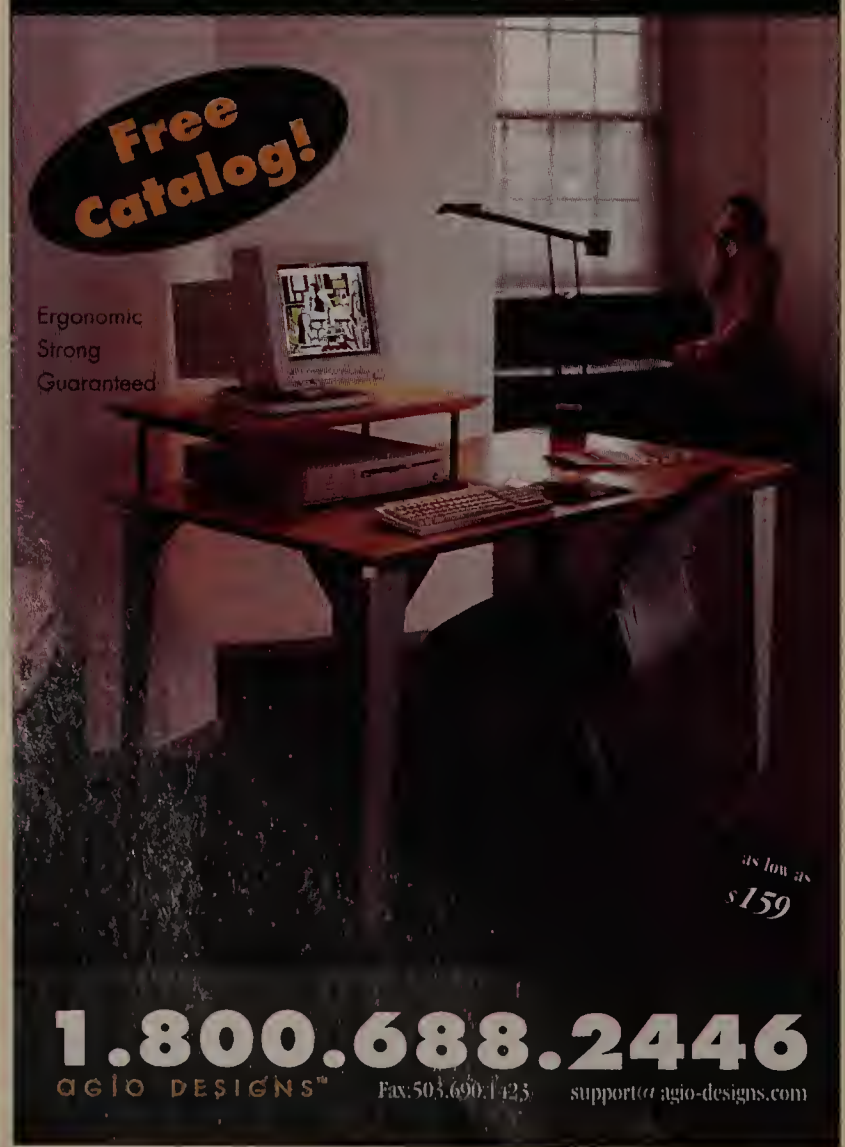

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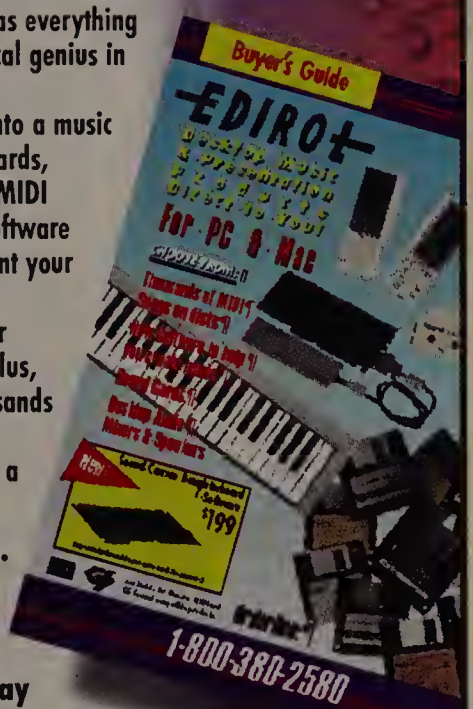

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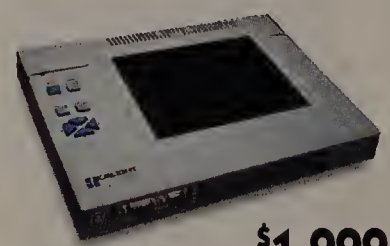

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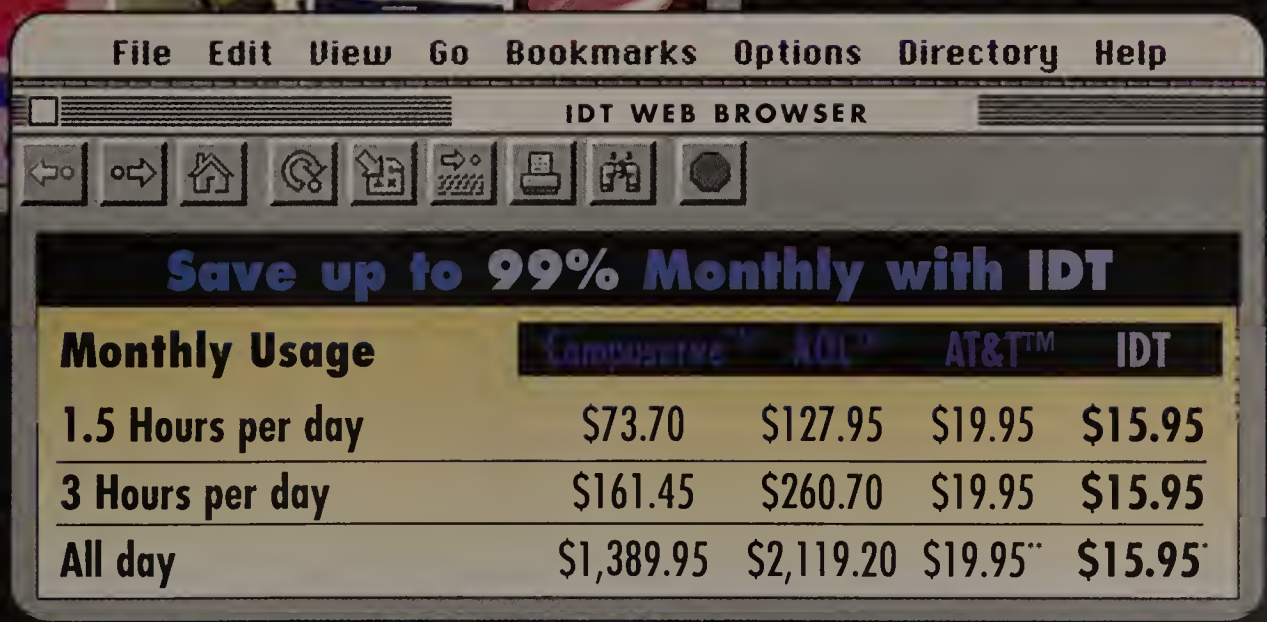

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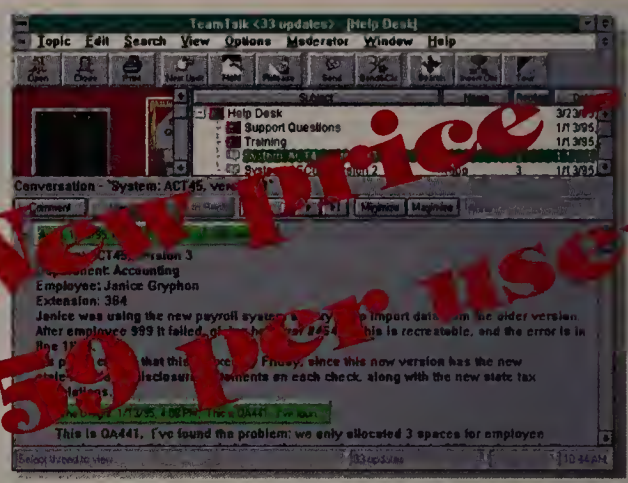

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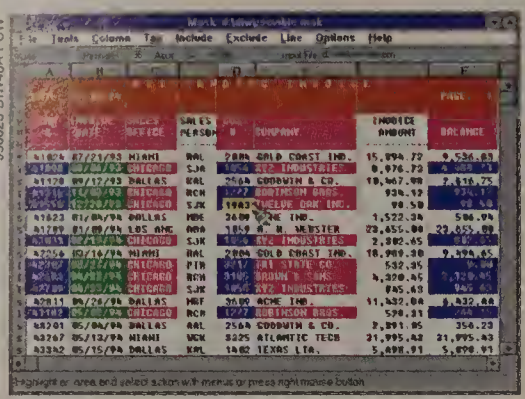

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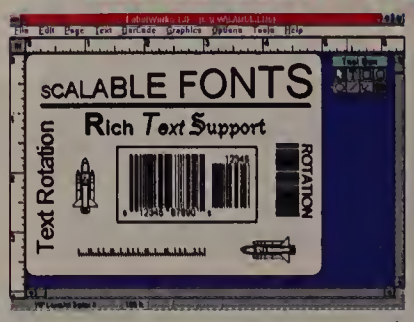

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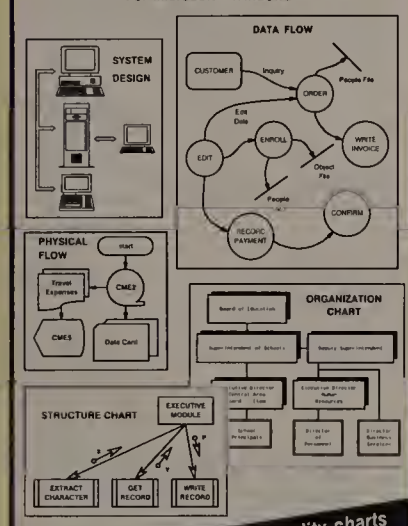

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Premium SE 4/50, d, 66d, P/60	1 Meg	500780-003	34.00
Prem 386/33T, 386 SX16, Prem.II 386SX.20, 386/25	4Meg	500780-004	99.00
Premmia GX P/90, P/100	8Meg Kit/18MegKit	S01565-001/501566-001	156/278
	32Meg Kit/64Meg Kit	501567-001/501568-001	578/1072
AST Cupid Board	0-32 Meg	500818-001	159.00

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Ambra Pentium-60	4/8/16 Meg	89/169/369
Ambra NC 425SL	2/4/8 Meg	79/129/199
Ambra N Series	*4/8/12/16 Meg*	*139/219/329/439*
Ambra SN Series	4/16 Meg	139/529
Ambra Sprinta SLC II	2/8 Meg	64/210
Ambra N-75, N-100	4/8/16	139/269/524

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IBM PART NO	WORKS WITH MODEL NO.	PRICE
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6450604/92G7196 (2Meg)	70-061, E61, 121, 50Z, 55SX, 65SX, P-70, 55LS, 65LS X-Station 120 & 130, 35SX, 35LS, 40SX	49.00
6450608 (2Meg)	70-A21, A-61, B-21, B-61, 35SX, 35LS, 40SX, Vel Pt. 325T	49.00
34F2933 (4Meg)	35SX, 40SX, 55SX, 65SX, 55LS, 65LS	89.00
87F9977/92G7199 (4Meg)	55SX, 55LS, 65SX, 40SX, 35SX, 35LS	89.00
92F993S (2Meg)	P/51 & P/S1/386SX-2121	89.00
92F9694 (4Meg)	P/51 & P/S1/386SX, Model-2121	119.00
92G7200 (4Meg)	PSI Expert, Consultant, Willow	89.00
4Meg/8Meg/16Meg/32Meg	*PC 300 Series*	*87/134/279/536*
4Meg/8Meg/18Meg/32Meg	*PC 700 Series*	*87/134/279/536*
4Meg/8Meg/18Meg/32Meg	*PC Power Series*	*87/134/279/536*
4Meg/8Meg/18Meg/32Meg	*PC Server 300, 325, 520*	*87/134/279/536*
8Meg/16Meg/32Meg (Ecc)	*PC Server 500*	*219/419/819*
92G7334 (16Meg 168 pin Edo)	*IBM 730/750*	*349.00*
92G7335 (32Meg 168 pin Edo)	*IBM 730/750*	*749.00*
92G7530 (4Meg)	Aptiva 310, 330, 350, 510, 530, 710, 730, Pentium	67.00
92G7541 (6Meg)	Aptiva 310, 330, 350, 510, 530, 710, 730, Pentium	134.00
92G7543 (16Meg)	Aptiva 310, 330, 350, 510, 530, 710, 730, Pentium	279.00
92G7545 (32Meg)	Aptiva 310, 330, 350, 510, 530, 710, 730, Pentium	536.00
73G3131/92G7201 (4Meg)	Value Point Performance, PC Server 4/66	89.00
73G3132/92G7203 (8Meg)	Value Point Performance, PC Server 4/66	169.00
60G1622/92G7204 (18Meg)	Value Point Performance, PC Server 4/66	349.00
92G7205 (32Meg)	Value Point Performance, PC Server 4/66	689.00
6450902 (2Meg)	56, 57, 57SX, 90, 95, P-75, 57SLC	69.00
6450128/92G7200 (4Meg)	Value Point 77 486DX2, 486SX, SVR 85 57SX, 90, 95, P-75, 57SLC, 58, 56SLC, P/51, 386SX, Mod-2123, 2133, 2155, Vel Pt 77, 486CS2, 486SX, SVR6S	86.00
6450129/92G7428 (8Meg)	Value Point 77 486DX2, 486SX, SVR 85 35SX, 40SX	169.00
6450130/92G7202 (8Meg)	56, 57, 57SX, 90, 95, P-75, S75LC	169.00
6451158/92G7208 (4Meg ecc)	Value Point 77 486DX2, 486SX, SVR 85 486, 95XP: 95A (install in pairs)	109.00
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66G0094 (4Meg)	Thinkpad 755, 360, 355, 340, 450	119.00
66G0094 (8Meg)	Thinkpad 755, 360, 355, 340, 450	219.00
66G0094 (16Meg, 32Meg)	*Thinkpad 755, 360, 355, 345, 436*	*439/1069*
4Meg/8Meg/16Meg	*Thinkpad 500*	*119/219/429*
8189098 (4Meg)	Thinkpad 500, 510CS (3.3 volt)	129.00
8180099 (8Meg, 16Meg)	Thinkpad 500, 510CS (3.3 volt)	249/489
79F0999 (2Meg)	LX40, N33SX, PS Note	69.00
79F1000 (4Meg)	LX40, N33SX, PS Note, Tkpd 350, 350c, PS Note 425	119.00
79F1001 (8Meg)	LX40, N33SX, PS Note	219.00
Hard Drive (810 Meg, 1.3 Gig)	Thinkpad 750, 755, 380, 355	719/797
(4Meg/16Meg)	Thinkpad 755 Dimm Modules	119/459
(4Meg/16 Meg w/Adap	Thinkpad 755	198/597
60G0378 (8Meg)	Thinkpad 350, 350c, PS Note 425	229.00
60G0379 (16Meg)	Thinkpad 350, 350c, PS Note 425	457.00
4Meg/8Meg/16Meg	*Thinkpad 360, 385*	*119/219/429*
4Meg/8Meg/16Meg/32Meg	*Thinkpad 700*	*146/279/488/976*
4Meg/8Meg/18Meg	*Thinkpad 701*	*109/209/416*
92G7259 (4Meg)	Thinkpad 701C, CS, Butterfly	109.00
92G7261 (8Meg)	Thinkpad 701C, CS, Butterfly	209.00
92G7263 (16Meg, 32Meg)	Thinkpad 701C, CS, Butterfly	419.00
4Meg/8Meg/16Meg (730T only)	Thinkpad 340, 730T	139/269/524/1586
(4Meg, 8Meg, 16Meg)	Thinkpad 760	119/239/449
8Meg/16Meg	Thinkpad 820	390/729
4Meg/8Meg/16Meg/32Meg	Thinkpad 850	193/399/719/1439
4Meg/8Meg/16Meg/32Meg	*Thinkpad 760*	*119/224/439/1469*
Hard Drive (616Meg)	*Thinkpad 760*	*529.00*

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	1Meg Board/4Meg Board		99/201
Deskpro 386 25E/20E	1Meg Module/4Meg Module		79/129
	1Meg Board/ 4 Meg Board		99/201
Deskpro 386/25, 20	1Meg Module/4Meg Module		79/129
Deskpro System Pro 386/33, 486/25, 486/50L		2/8/32Meg	91/244/854
Deskpro 4/66i, 4/33i, 4/25IS, 3733I, 3/25I		2/4/8Meg	59/89/169
Deskpro "M" Series	Expansion Board 0K		118
Deskpro 450, 466, 4100, 575, 590, 5120, 5133		4/8/16/32Meg	89/169/369/689
Deskpro XE 433S, 450, 466		2/4/8Meg	69/109/200
Deskpro XE 560 (pairs)		4/8/16/32/64Meg	67/134/279/536/999
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Presario 433, CDS520, CDJV520, CDL524, CDS526, CDTV528 660, CDS660, CDS720, CDS724, CDS744, CDS860 CDS920, CDTV920, 924, CDS924, CDS954		4/8/16/32Meg	87/134/279/589
Presario 400 Series, 600 Series, 800 Series		4/8/16/32Meg	67/134/279/589
Presario CDS774, CDS972, CDS982, CDTV978, CDS974 (In pairs) CDS992, 7152, 7170, 7180, 9546, 9548, 9564		4/8/16/32Meg	67/134/279/589
Prolinea 4/25S, 4/33, 4/33S, 4/50, 4/66, CDS		1/2/4/6Meg	59/69/69/189
Prolinea MT 4/33S, 4/50, 4/66, Enhanced 4/33S, 4/50S, 4/50, 4/66		4/8/16/32 Meg	89/169/349/699
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Elite 5000, 5200	*8Meg/16Meg/32Meg/64Meg*		*219/419/782/1525*
LTE/386S/20	4Meg Module	121125-002	129.00
LTE LITE/20, 25, 25C	4Meg Module	129789-002	129.00
LTE LITE/20, 25, 25C	8Meg Module	129789-003	229.00
LTE LITE/20, 25, 25C	16Meg Module	129769-004	509.00
LTE LITE 425C/33C/25E/25L	4Meg Module	142337-002	134.00
LTE LITE 425C/33C/25E/25L	8Meg Module	142337-003	250.00
LTE LITE 425C/33C/25E/25L	16Meg Module	142337-004	460.00
SLT/386	4Meg Module	118305-001	129.00
Concerto, LTE Elite	4Meg	144790-001	119.00
	8Meg	144790-002	219.00
	16Meg	144790-003	429.00
Contura 320, 325	4Meg	139498-001	119.00
	8Meg	139499-001	219.00
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	8Meg	146521-001	229.00
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1060 SCSI	279						
2.1 SCSI	629						

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S-RAM Cards 2MEG	199	*SCSI Type II*	*119*
28.8/14.4 Data/Fax Modem	189	*Audio Card*	*146*
14,400/14,400 Data/Fax Modem	94	Multimedia Combo, Sound/SCSI	499
Readwriter Card (15A Slot)	149	Type III 260 Mg Hard Drive	419
Lan Ethernet (Coax), (1D Base T)	89	Type III 340 Mg Hard Drive	567
		Xircom Combo Ethernet + Modem II 28.8 Adapter	549

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T2000SXE/2200SX/T1600, 1850, C	2Meg/4Meg/8Meg	PC-PA2000U	69/139/279
T2100, 2105, 2150, 2155, 2110, 2115	4Meg/8Meg/16Meg/24 Meg		107/259/449/671
T4400SX, SXC T6400, T6600	4Meg	PC-PA2004U	129.00
T4400SX, SXC T6400, T6600	6Meg	PC-PA2005U	229.00
T4400SX, SXC T6400, T6600	16Meg	PC-PA2010U	499.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	4Meg	PC-PA2012U	119.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	8Meg	PC-PA2013U	219.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	16Meg	PC-PA2014U	429.00
T4700, 4800, 4850 (Hard Drive)	810Meg/1.3 Gig		709/819
T3400CT, T2400, T3600	4Meg/8Meg/16Meg	PC-PA2019U	129/249/519
T600, 610, CT Edo	6Meg/16Meg/32Meg		219/489/957
T400CS, 400CDT, T100, 105 Edo	*6Meg/16Meg/32Meg*		*219/489/957*

NOTEBOOK, LAPTOP MEMORY

MODEL	AMT. UPGRADED	MANU. PART #	PRICE
ACER 730, 735C, 760, 780	2Meg/4Meg/8Meg		89/139/258
ACER 763, 765, 782, 784, 786, 787,	4Meg/8Meg/16Meg		119/219/439
ACER 750	4Meg/8Meg/16Meg		119/219/439
ACER Note Pro, ACER Note Lite	*4Meg/8Meg/16Meg*		*109/199/439*
ARM TS38	4Meg/8Meg/16Meg		119/219/439
AST Ascentia J18	*8Meg/16Meg/32Meg*		*199/359/695*
AST Ascentia 900N 800N, 810, 91D	4Meg/8Meg/16Meg		119/219/439
AST Ascentia 950	8Meg/16Meg		269/499
AST Bravo & Explorer	*4Meg/16Meg*	*501255-001, -002*	*109/436*
AST Notebook Prem Exec 386SX/20/25/25L	4Meg	500814-003	109.00
AST Power Exec 3/25C, 425EL, 425SL	4Meg/16Meg	501166-001, -003	119/459
AST Power Exec 4/33SL	4Meg/16Meg	501318-001,002	139/479
AT&T Globalyst 130, 200 *(Call for other Globalyst)*	4Meg/8Meg/16Meg		119/219/439
AT&T Safari NSX/20	4Meg	PEC 376S1	219.00
Austin DX4, DX2, SX2, SX Series	4Meg/16Meg		119/449
Bondwell B310, Plus	1Meg	23050-09100	59.00
Bondwell B310V, SX	4Meg		206
Canon Innova Book 150	4Meg/16Meg		119/467
Canon Innova Book 200LS	4Meg/8Meg/16Meg/24Meg		119/219/439/671
Canon Innova Book 350CD	*4Meg/8Meg/18Meg*		*139/229/499*
Canon Innova 486-10	4Meg/16Meg		119/469
Canon Notejet 486-25	4Meg/8Meg		139/289
Canon Notejet 486-33, 486C, 25 and 33	4Meg/8Meg		149/289
Canon Notejet 486c, 75, 100	8Meg/16Meg		219/499
Compuadd 450ns, 475ns	4Meg/16Meg		139/499
DEC HiNote, Ultra HiNote	4Meg/8Meg/16Meg		119/219/449
DEC HiNote VP	*8Meg/16Meg/32Meg*		*279/549/Call*
Dell Lattitude LX 4100C, MX, MC, M	4Meg/8Meg/16Meg		109/199/457
Dell Lattitude XPI	4Meg/8Meg/16Meg		109/199/457
Dell Lattitude XP, 475, 4100, 4100CX	4Meg/16Meg		129/449
Dell Latitude 486, 425, 433C, 433CX, 450, 450CX	4 Meg/16 Meg		129/449
DTK, DTN 4T 100P, 5P60	4Meg/16Meg/32Meg		229/469/910
Epson ActionNote 650, 650c, 660c, 660cx	4Meg/8Meg/16Meg		119/219/439
Epson ActionNote 700, 700c, 700cx	4Meg/16Meg		119/499
Epson ActionNote 800, 880, 866c	4Meg/8Meg/16Meg/20Meg		119/219/459/599
Epson ActionNote 890	*4Meg/8Meg/18Meg*		*119/229/499*
Epson ActionNote 4000 Notebook	6Meg		189
Epson ActionNote 4LC/25, 4LC/33, 4SLC/2-50	6Meg		169
Everex Tempo LX, LX20, Carrier	2Meg	PCA 00053-0001	89.00
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Gateway 2000 Nomad 425 DXL/SXL	4Meg/16Meg		170/759
Gateway 2000 466 Handbook or Liberty	4Meg/16Meg		119/459
Gateway 2000 Solo Series	8Meg/16Meg/32Meg		Call
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HP Omnibook 530, 600	4Meg/8Meg/12Meg		119/229/419
HP Omnibook 4000	4Meg/8Meg/16Meg		119/229/499
HP Omnibook 5000	6Meg/16Meg/32Meg		229/499/999
Leading Edge Avive 2000	4Meg/16Meg		119/459
Lexmark SE10	4Meg/8Meg		119/249
Magnavox Metalis	4Meg	286, 386SX	119
Midwest Micro Elite 5X-25, 5X33, 0X2-50, 0X2-66	4Meg/8Meg/16Meg		119/219/469
Midwest Micro Elite 5mdbk 5X33, 0X3-50, 0X4-75, 0X4-100	4Meg/8Meg/16Meg		119/219/469
Midwest Micro Elite 5mdbk Plus D5-75, D5-90	4Meg/8Meg/16Meg		119/219/469
Mitsuba Ninja II	4Meg/8Meg/16Meg		119/219/469
MPC Model 380	4Meg/8Meg/16Meg		119/219/469
NCR Safari 3180, 3181	4Meg/8Meg		119/229
NEC Ultralite Versa, E, V, MP	4 Meg/8Meg/16Meg/20Meg	OP4104	119/229/469/589
NEC Versa Removable Hard Drive	810Meg/1.3 Gig		509/779
NEC Versa S, Versa 2000C & 2000D	4Meg/8Meg/16Meg		119/219/469
NEC Versa 4000, 4050/4080	4/8/16/32Meg		119/219/469/799
Packard Bell 386SX, 286	4Meg	286, 386SX	119
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Panasonic CF380, CF480	2Meg/4Meg/6Meg		79/119/179
Panasonic CF-V21P, CF-560	4Meg/16Meg		119/439
Panasonic CF-V41	4Meg/8Meg/16Meg/32Meg		119/219/449/999
Sanyo 17/18 NB	2Meg	M8C-N8MEM2	69.00
Sharp 6781, 6881, 876S, 6700, 6800, 8741	2Meg/4Meg		89/149
Sharp 8150, 8650, 8660, 7700, 7760	4Meg/16Meg		119/439
Sharp 8700, 8800, 8900	4Meg/8Meg/16Meg		109/219/439
Sharp 3010, 3020, 3050, 3060	4Meg/8Meg/16Meg		104/199/439
TI 4000, TI 4000E, TI 4000M	4Meg/16Meg		170/768
TI 6000, 6100	*6Meg/18Meg*		*274/548*
TI 8000	*8Meg/18Meg*		*218/399*
TI Extensa, 450, 450T, 455, 455T	4Meg/8Meg/16Meg		119/219/419
TI Extensa, 550, 555, 560, 565 (pairs)	*4Meg/8Meg/16Meg*		*118/219/416*
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Zenith Master Sport SL, SLE, 600, 820, 625NL	2Meg	ZA-4-4	89.00
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286E, SX	2Meg	ZA-180-64	89.00
SX Alpha/SX Beta	2Meg	ZA-180-86/ZA-180-87	89.00
Zenith Z-Note 425LN, LNC, LNP	4Meg		129.00
Zenith Z-Star 4/33	2Meg/8Meg		89/219
Zenith Z-Star EX	*4Meg/8Meg/16Meg*		*118/219/456*

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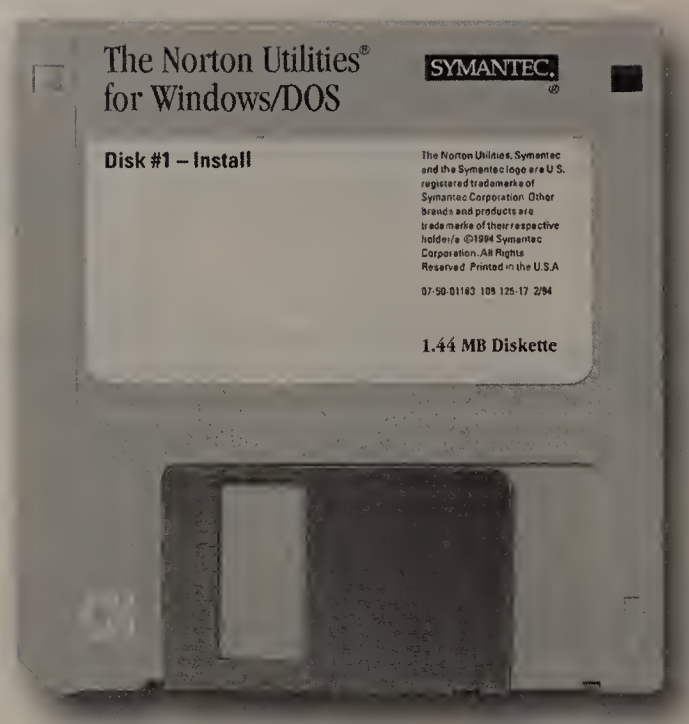
Canon LBP 860, 1260	–	–	–	69	–	–	99	–	–	199	359	699
Canon LBP4, 4Lite, 4plus	–	–	129	179



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Pentium 90	11.3" Active SVGA	8/772M8	4399*

* Features built-in 4X CD-ROM drive

Satellite 100CS

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* Features EDO RAM memory

90MHz Pentium

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Processor	Screen	RAM/HD	Price
Pentium 120	11.3" Dual Scan SVGA	8MB/1.13G8	$3999
Pentium 120	11.3" Active SVGA	16MB/1.13GB	4999
Pentium 133	12.1" Active SVGA	16MB/1.2GB	6299*

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Pentium 120	11.3" Dual Scan	8/810M8	3599
Pentium 120	12.1" Active SVGA	8MB/1.08GB	4799
Pentium 133	12.1" Active SVGA	16MB/1.08G8	5499

* Includes built-in 4X CD-ROM drive

ThinkPad® 760E and 760ED

Processor	Screen	RAM/HD	Price
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Pentium 133	12.1" Active SVGA	16MB/1.08G8	5999
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Pentium 90	10.4" Active	8/810M8	4549*

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Processor	Screen	RAM/HD	Price
Pentium 75	9.5" Active	8/810M8	$2499

NEC Versa 550D

Processor	Screen	RAM/HD	Price
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Pentium 90	10.1" Active	8/810M8	4349*
Pentium 120	10.4" High Res.	BMB/1GB	4399

* Features built-in 4X CD-ROM drive

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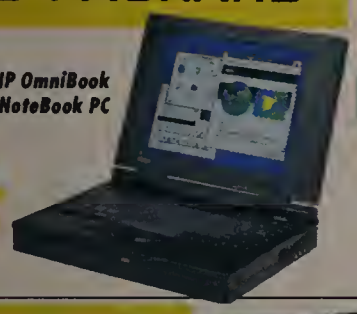

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HP OmniBook 5000

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Processor	Screen	RAM/HD	Price
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Pentium 90	10.4" Active	8MB/1.2GB	4449
Pentium 90	10.4" Active SVGA	16MB/1.2GB	4709
Pentium 120	10.4" Active SVGA	16MB/1.2GB	4939

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Processor	Screen	RAM/HD	Price
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Processor	Screen	RAM/HD	Price
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Pentium 100	11.3" Dual Scan SVGA	8MB/1.2GB	3779
Pentium 133	11.3" Active SVGA	8/800MB	4249
Pentium 133	11.3" Active SVGA	8MB/1.2GB	4729

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Processor	Screen	RAM/HD	Price
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Pentium 100	10.4" Dual Scan SVGA	8/800MB	2639
Pentium 100	10.4" Active Matrix SVGA	8/800MB	2839
Pentium 133	10.4" Active Matrix SVGA	8/800MB	3299

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Contura 430

Processor	Screen	RAM/HD	Price
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Pentium 90	10.4" Active	8/810MB	3970
Pentium 90	10.4" Active	8/810MB	4340*
Pentium 120	10.4" Active	8MB/1.35GB	4720
Pentium 120	11.3" Active SVGA	16MB/1.35GB	5099
Pentium 133	12.1" Active SVGA	16MB/1.35GB	5669

* Features Built-in CD-ROM drive

Built-In CD-ROM

on LTE 5200, optional accessory on other LTE 5000 models.

LTE 5000

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Pentium 75	10.4" Active	8MB/1.2GB	3419
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Pentium 100	10.4" Active	8MB/1.2GB	3909

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- 256KB Level 2 cache
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UP TO 133MHz PENTIUM

Processor	Screen	RAM/HD	Price
Pentium 90	10.4" Active SVGA	8MB/1.2GB	$3419
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Pentium 133	11.3" Active SVGA	8MB/1.2GB	4499

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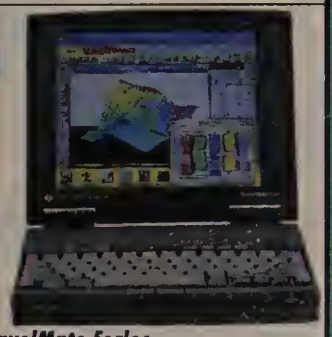

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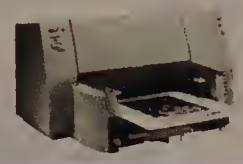

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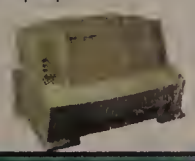

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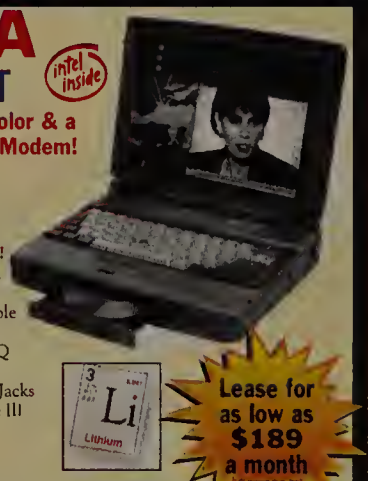

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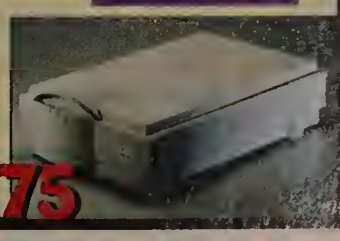

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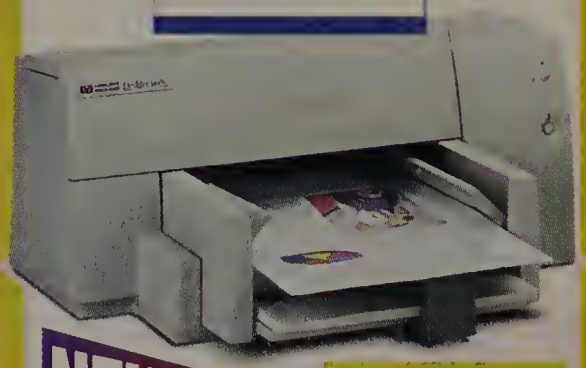

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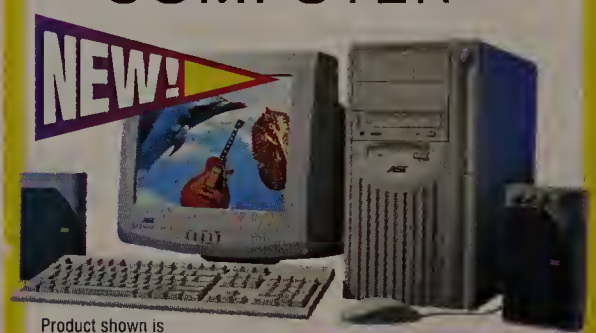

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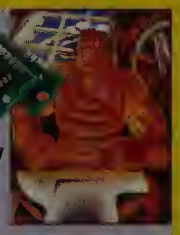

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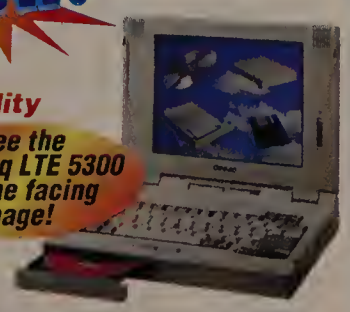

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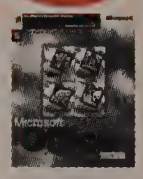

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Xircom Ethamet combo	182.33
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Smart & Friendly	**2Xr2Xw**	**Complete PC Kit**	**$829**		
Pinnacle Micro	**4Xr2Xw**	**Complete PC Kit**	**$909**		
Yamaha bare drive	**2Xr4Xw**	**$749**	**4Xr4Xw**	**$1119**	

CD ROM DRIVES

SCSI CD ROM (add $90 for external)

Sanyo	4X	190ms	$115	Sony	4X	250ms	$129
NEC	4X	200ms	$122	Pioneer	4.4X	140ms	$169
Plextor	4.5X	130ms	$249	Teac	6X	160ms	$245
NEC	6X	150ms	$269	Plextor	6X	145ms	$289
Toshiba	6.7X	120ms	$239	Plextor	8X	145ms	$415
Toshiba	8X	145ms	$299				

IDE (ATAPI) CD ROM

Mitsumi	4X	230ms	$65	Toshiba	4X	190ms	$71
Teac	6X	110ms	$119	NEC	6X	145ms	$99
Toshiba	6X	170ms	$99	Teac	8X	110ms	$169
Toshiba	8X	145ms	$159	NEW!	10X	130ms	$289

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IDE-Internal
NEC 4X 4Disk $189 NEW! 3Disk 4X $155
SCSI-External
Pioneer 4.4X DRM-624X 6 Disk 190ms 256K $319
Pioneer 4X DRM-1804X 8Disk 300ms 612K $1899

7 Drive CD ROM TOWERS (1-21 Drive towers & other brands available!)
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REMOVABLES

OPTICAL DRIVES

230MB	Fujitsu DynaMO Bare		$419
230MB	Fujitsu DynaMO Parallel Ext with 1 disk		$439
230MB	Fujitsu DynaMO PC Ext w/controller, & 1 disk		$499
2.6Gig	Maxoptix	Int/Ext	$1925/$2025
2.6Gig	HP	Int/Ext	$2125/$2225

SYQUEST DRIVES

EZ 135MB •13.5ms, 3600rpm, 128K buffer, 3 1/2" drive
Internal IDE with disk / External SCSI with disk $190/$199
External parallel port with 1 disk $249
270MB • 13.5ms, 3600rpm, 128K buffer, 3 1/2" drive
Internal IDE (SQ3270A)/ with 1disk (S3270AC) $299/$339
External for parallel port with 1 disk $429
SCSI drive (SQ3270S)/SCSI external(S3270X) $339/$399
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SCSI drive (SQ5200)/SCSI external(SQ5200CX) $339/ $399
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135MB $27/24/21 200MB $79/74/71 270MB $60/58/55

IOMEGA DRIVES

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External SCSI w/ 1 disk $199
Parallel External w/ 1 disk $199
1 Gig JAZ • 3.5" x 1" high form factor
Internal SCSI w/ 1 disk $499
External SCSI w/ 1 disk $599

Adaptec controller A1505CDKIT only $49 when purchased with Zip or Jaz drive.

TAPE DRIVES

Prices include 1 free tape! Save $10 with hard drive!

1 Gig	Seagate	$159		800MB	Seagate	$141	
1.7Gig	Seagate	$219		4.4Gig	Seagate	$259	

Parallel External for printer port 1 Gig $269

SCSI TAPE DRIVES (bare, no tape)

2Gig	HP	DAT	$609	2-4Gig	Seagate	DAT	$679
2Gig	Seagate	DAT	$599	4-8Gig	Seagate	DAT	$859
2-4Gig	Seagate	QIC	$349	4-8Gig	HP	DAT	$879
2-4Gig	HP	DAT	$699	7-14Gig	Exabyte	8mm	$1889

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The sleek, stand alone drive features a 7-gigabyte native, or 14-gigabyte compressed capacity, backup rate of up to 60 megabyte-per-minute. Complete backup kit includes: External drive w/ controller, cable, 1 tape, 1 cleaning tape, and a CD ROM w/ Arcada backup for DO5/WIN and your choice of Arcada for NetWare, Arcada for NT, Cheyenne for NetWare, or Palindrome backup director.

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Out of drive bays? Looking for an easy way to upgrade your hard drive storage capacity? This hard disk card from *Smart Storage Solutions* is the answer. Just insert the card in a 16 bit slot. It comes preformatted and will work in any 3B6 or higher computer.

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SCSI HARD DRIVES

SCSI	Speed	RPM	Brand	Model	Wty	Price
850MB	14ms	4500	Quantum	TB850S	3	$195
1050MB	9ms	5400	Seagate	ST31051N	3	$349
1080MB	11ms	5400	Seagate	ST51080N	3	$235
1280MB	12ms	5400	Quantum	FB1280S	3	$276
2050MB	8.5ms	7200	Micropolis	MC4221	5	$544
2050MB	8.5ms	7200	Micropolis	MC4221AV	5	$600
2147MB	9ms	5400	Micropolis	MC4421	5	$444
2147MB	9ms	5400	Seagate	ST32151N	5	$600
2147MB	8ms	7200	Seagate	ST32550N	5	$675
2150MB	8ms	7200	Quantum	XP32150	5	$630
4290MB	8ms	7200	Seagate	ST15150N	5	$989
4290MB	9ms	5400	Seagate	ST15230N	5	$905
4294MB	8.9ms	7200	Micropolis	MC3243	5	$859
4294MB	8.9ms	7200	Micropolis	MC3243AV	5	$945
4300MB	8.6ms	7200	Quantum	XP34300	5	$900
9091MB	12ms	5400	Micropolis	MC1991	5	$1840
9091MB	12ms	5400	Micropolis	MC1991AV	5	$1959
9080MB	11ms	5400	Seagate	ST410800N	5	$1880
WIDE SCSI						
2050MB	8.9ms	7200	Micropolis	MC4221W	5	$630
2050MB	8.9ms	7200	Micropolis	MC4221WAV	5	$689
2147MB	8ms	7200	Seagate	ST32550W	5	$675
2150MB	8ms	7200	Quantum	XP32150W	5	$680
4294MB	8.9ms	7200	Micropolis	MC3243W	5	$945
4294MB	8.5ms	7200	Micropolis	MC3243WAV	5	$1035
4294MB	8ms	7200	Seagate	ST15150W	5	$1065
4300MB	8.6ms	7200	Quantum	XP34300W	5	$959
9080MB	11ms	5400	Seagate	ST410800W	5	$2029
9100MB	12ms	5400	Micropolis	MC1991W	5	$1929
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SCSI CONTROLLERS

Save $10 when you purchase any SCSI controller with any SCSI drive.

ADAPTEC

Adaptec kits include controller, cable, and EZ-5C5I software to support hard drives, Optical, Removable, CD ROM.

1505	I5A 16Bit 5C5I (no hard drive support)	$60
1515	ISA 16Bit SCSI	$97
1520	ISA, PIO, 10MB/s	$145
1522	I5A 16Bit 5C5I, Floppy	$155
1540	Bare, I5A, Bus Master	$199
1542	ISA 16Bit Busmaster 5C5I, Floppy	$270
1640	MicroChannel SCSI	$339
2742	EISA 32Bit SCSI, Floppy	$379
2842	Local Bus 32Bit 5CSI, Floppy	$255
2920	PCI 32Bit 5C5I (PIO)	$169
2940	PCI 32Bit SCSI (Bus Master)	$239
2940UW	PCI ULTRA WIDE SCSI	$295
T34B	Bidirectional Parallel to SCSI	$105
T358	EPP to 5C5I adapter	$139
T1460	PCMCIA type 2, 3, or 4 to SCSI	$195
A3940	Twin Channel PCI SCSI (14 Drives)	$439
A3940W	Twin Channel PCI WIDE 5C5I	$529
A2825KIT	VE5A Local Bus IDE & 5C5I	$135

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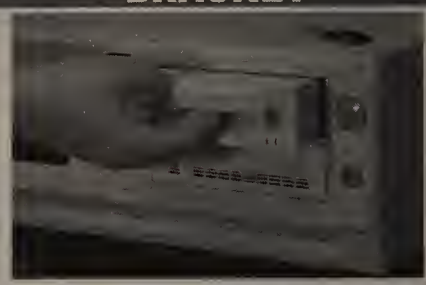

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SCSI	**$85**	**$40**	**$54**
WIDE SCSI	**$129**	**$64**	**$75**

IDE HARD DRIVES

IDE	Speed	RPM	Brand	Model	Wty	Price
631MB	14ms	3800	Seagate	ST3630A	3	$170
639MB	11ms	4500	Western Digital	AC2635	3	$170
850MB	10ms	4500	Western Digital	AC2850	3	$182
850MB	14ms	4500	Quantum	TB850A	3	$185
1080MB	11ms	5400	Seagate	ST51080A	3	$196
1080MB	9.5ms	5400	Fujitsu	M1606T	3	$209
1084MB	14ms	4480	Maxtor	M71084A	2	$200
1090MB	11ms	4500	Fujitsu	M1614T	3	$195
1250MB	15ms	3600	Quantum	BF1250A	3	$200
1280MB	12ms	5400	Quantum	FB1280A	3	$216
1280MB	10ms	5200	Western Digital	AC21200A	3	$205
1282MB	10.5ms	5400	Seagate	ST51270A	3	$207
1330MB	12ms	4480	Maxtor	M71336A	3	$207
1624MB	10ms	5200	Western Digital	AC31600	3	$249
1625MB	10.5ms	5400	Seagate	ST31640A	3	$275
1626MB	12ms	4480	Maxtor	M71626AP	3	$249
1700MB	11ms	4500	Quantum	SR31700A	3	$247
2004MB	12ms	4480	Maxtor	M72004A	3	$289
2100MB	10ms	5200	Western Digital	AC32100	3	$310
2167MB	10ms	5400	Seagate	ST32140A	3	$299
2500MB	15ms	3600	Quantum	BF2500A	3	$319
2500MB	11ms	4500	Quantum	SR32550A	3	$335
2559MB	11ms	5200	Western Digital	AC32600	3	$350

IDE CONTROLLERS

Save $5 when you purchase any IDE controller with any IDE drive.

TEKRAM

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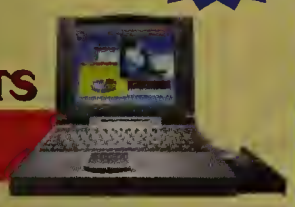

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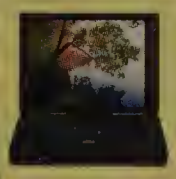

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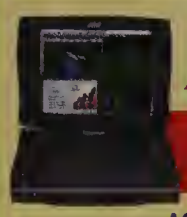

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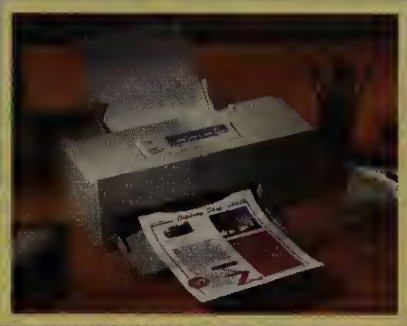

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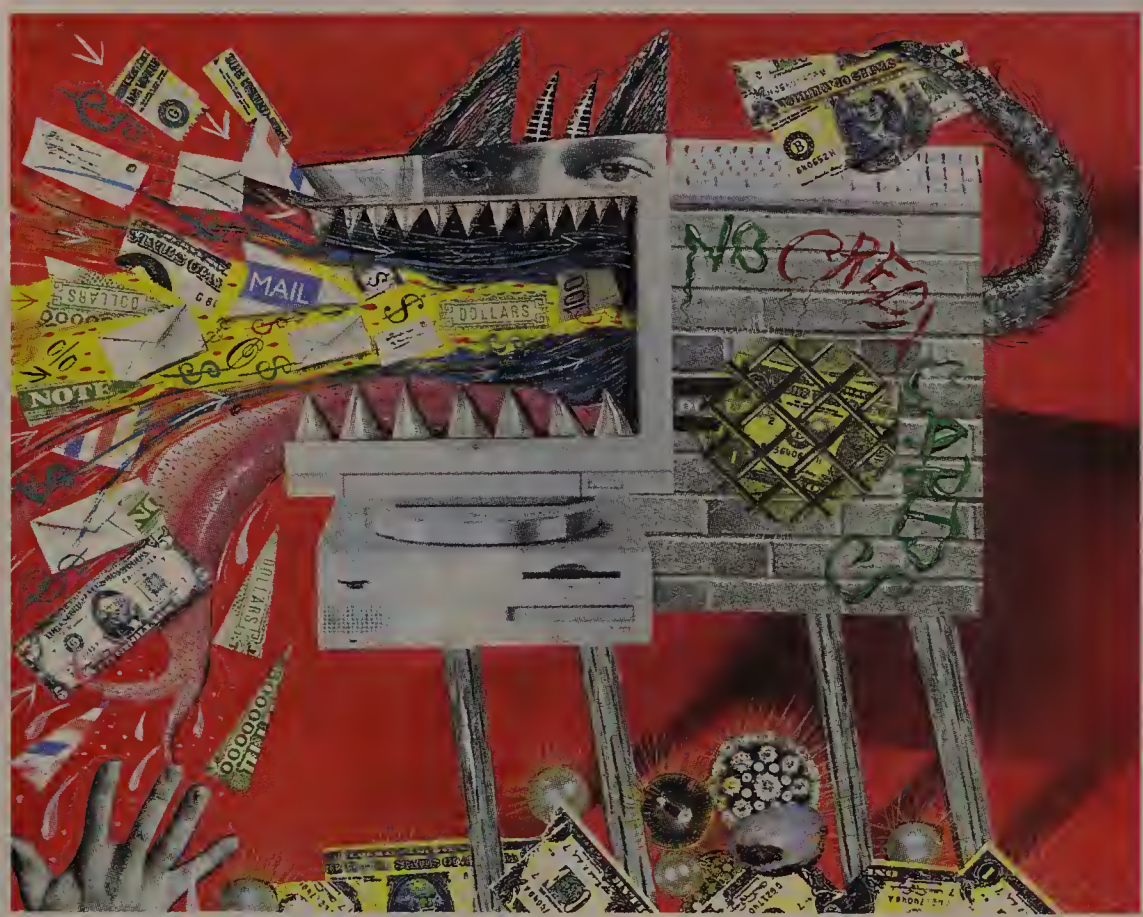

Consumer Watch

The ABCs of Mail-Order Shopping

BY ROBERTA FURGER

Jeffrey Ratliff-Crain was looking for a new PC and spotted a great deal in an advertisement from a mail-order firm called PC Distributor. The full-page ad featured products from Compaq, Hewlett-Packard, IBM, and others. The prices were better than any local store was offering, so Ratliff-Crain called the company, placed his order, and sent them a check for $3300. His check was cashed, but Ratliff-Crain—like other customers—never received his order. PC Distributor disconnected its phone lines and closed its doors, leaving dozens of unfulfilled orders in its wake.

"It was an expensive lesson," Ratliff-Crain says. "But never again will I send a check to a mail-order company."

"Once the check is cleared, it's too late," says Tom Taylor, the Postal Service's San Francisco Division postal inspector. "By then, the horse is out of the barn. Even if we catch the owners, there's not a lot we can do to get anyone's money back."

Fly-by-night mail-order outfits are the exception, not the rule. But, says Taylor, as computers become more common, they will attract more scam operators. "Computers are becoming more like TVs; everyone has one; everyone wants more. That makes them an effective medium for the theft of the nineties."

Does that mean you should just stop buying PC hardware and software by mail order? No. What it does call for, though, is extra caution before making a purchase.

DANGER SIGNS

Although there's no sure way of telling a legitimate company from a bogus one, be on the lookout for clues—many of which were present in PC Distributor's full-page ad.

No credit cards accepted. According to Taylor, companies must be in business at least two years and have "A-1" credit to open a merchant account with a major credit card company. They also must be secure enough financially to afford the bank transaction fees. While a company that accepts only cash is not *necessarily* illegitimate, this should be a warning flag. If you check out the company (see "Mail-Order Do's and Don'ts") and it appears to be on the up-and-up, ask your credit card company if you can write a check from your card account and still receive the protection that you would paying with your card.

Outrageously low prices. Many consumers we spoke with noted that PC Distributor's prices seemed too good to be true. A 133-MHz IBM Aptiva, for example, listed for only $1399. That's less than the price offered by IBM's retail outlet, which sells *refurbished* computers. "Whenever a company offers to sell you a wonderful system at half the normal price, that should be a big clue," says Taylor. "It's been said before, but if the offer seems to good to be true, it probably is," he adds.

Bizarre offers. PC Distributor sold an odd assortment of new and refurbished goods. The company even offered to throw in an HP DeskJet 320 with the purchase of every notebook or desktop computer. Although legitimate liquidators may sell an eclectic mix of products, the free giveaway is a classic ploy to lure the unsuspecting.

JANET WOOLEY

AFTER THE CRIME

Hindsight, as they say, has 20-20 vision. Here's what you can do if you find yourself the unlucky victim of a mail-order scam.

Step 1: Compile all your documentation. Put together a file that includes a copy of the advertisement, the names of anyone you spoke with at the company, any correspondence you received about your order, and a copy of your canceled check.

Step 2: Contact the authorities. Start with the U.S. Postal Inspector, the office primarily responsible for investigating crimes conducted through the U.S. mail. It has regional offices across the United States; you'll need to contact the one closest to the city the business is located in (rather than the one closest to *you*). Also send a copy of your complaint to your state attorney general's consumer protection unit. If enough residents are victimized, prosecutors may follow up on the complaints. Finally, make a copy for the local police department. Because of limited resources, local authorities often can't investigate, but for the cost of a stamp, it can't hurt.

According to Taylor, the Postal Inspector will open an investigation if it gets enough complaints. (It's against the office's policy to say whether it is investigating anyone, however.) The more documentation investigators have on a firm and its principals (canceled checks with account numbers, first and last names), the greater the chance of presenting a solid case to the U.S. Attorney. Even then, "it's a crap shoot" whether federal prosecutors will act, says Taylor. They consider the seriousness of the alleged crime and how expensive the case will be to pursue. Mail-order fraud cases can be very costly because victims are often located all over the country. So even if the Postal Inspector puts together a good case, the U.S. Attorney may not prosecute.

Step 3: File your own lawsuit. For losses under $5000, you can go to small claims court. You'll likely win, but collecting the judgment is another matter, according to Paul Bergman, a law professor at the University of California, Los Angeles and author of *Represent Yourself in Court* (Nolo Press, 1993, 510/549-1976). In a suit against a Florida-based firm, he explains, "Let's say a California resident wins in small claims court. They'd have to hire someone in Florida to collect. That will cost about half of what they recover." Only consumers who lost several thousand dollars may convince someone to try collecting.

The bottom line: Sending cash to a mail-order firm is risky, and your chances of recouping the money if the company goes south are slim. The best advice? Use common sense. Trust your instincts. Pay with a credit card. And make sure you know who you're buying from.

As always, you can contact Consumer Watch *with questions and problems. See page 14 for contact information.*

MAIL ORDER DO'S AND DON'TS

➤ **Get recommendations before buying.** Post a query on CompuServe (go support/computer systems or go components/pc hardware forum); to America Online's User Group Forum (go ugf) or Mail Order Forum (go pc hardware, then computers/mail order pc vendors discussion); or on the Internet (comp.sys.ibm.pc.hardware.systems).

➤ **Check with the Better Business Bureau.** If a company is unfamiliar, call the BBB in its city to see what's on file. But remember, a BBB query is most helpful for well-established businesses; new firms may have no track records. Don't assume no news is good news.

➤ **Verify that the equipment is new.** This is particularly important if you're purchasing upgrade equipment such as hard drives.

➤ **Request written verification of your order.** This will save you the hassle of shipping back an incorrect product and provides you with documentation should the company go out of business or bungle the sale.

➤ **Don't send cash.** Or a personal check, money order, or a cashier's check. You have no recourse if the company goes out of business without shipping your order.

Feedback

When Companies Die

We received a letter from Paul Riseman of Springfield, Illinois, complaining about his Zeos Pantera Pentium, which he purchased after reading good reviews in *PC World*. Zeos technical support was unable to get his PC running, despite many attempts. Ordinarily, we would forward Riseman's letter to Zeos. But on February 26, 1996, Micron Electronics, owners of Zeos, closed its subsidiary's doors for good. We forwarded the letter to Micron to find out not only what the company would do for Riseman but how it is planning to handle all Zeos customers. According to Ken Birch, vice president of strategic relations at Micron, Zeos customers will be treated just as if they were customers of Micron. Micron retained much of the Zeos support staff, and all Zeos phone support numbers are still working. You can also call Micron tech support lines for answers to general questions. Birch points out that there are more resources available to Zeos customers now than before: Overall, more support people are available, and you can also get help through the Internet (http://www. mei.micron.com). Micron is working with Riseman to resolve his computer problems.

TAKE NOTE: **89 percent of the respondents to a consumer survey agree students must learn computer skills to succeed in today's world.** Source: NSI/Techtel Consumer Technology Attitude Survey of 1000 U.S. households.

Unexpected Resolution

As the official complaint department at *PC World*, *Feedback* hears its share of horror stories about customer service gone awry. So it was pleasant to hear from Walter Lettaw of Sandy Hook, Connecticut. In January 1995, he bought a factory-refurbished Canon BJC-600 printer with a 90-day warranty. One year later, he began having problems with the printer and learned that it would cost him nearly what he

UPPER RIGHT: JAMES YANG; RIGHT: BILL RUSSELL

Cybertoys for Everyone in the House

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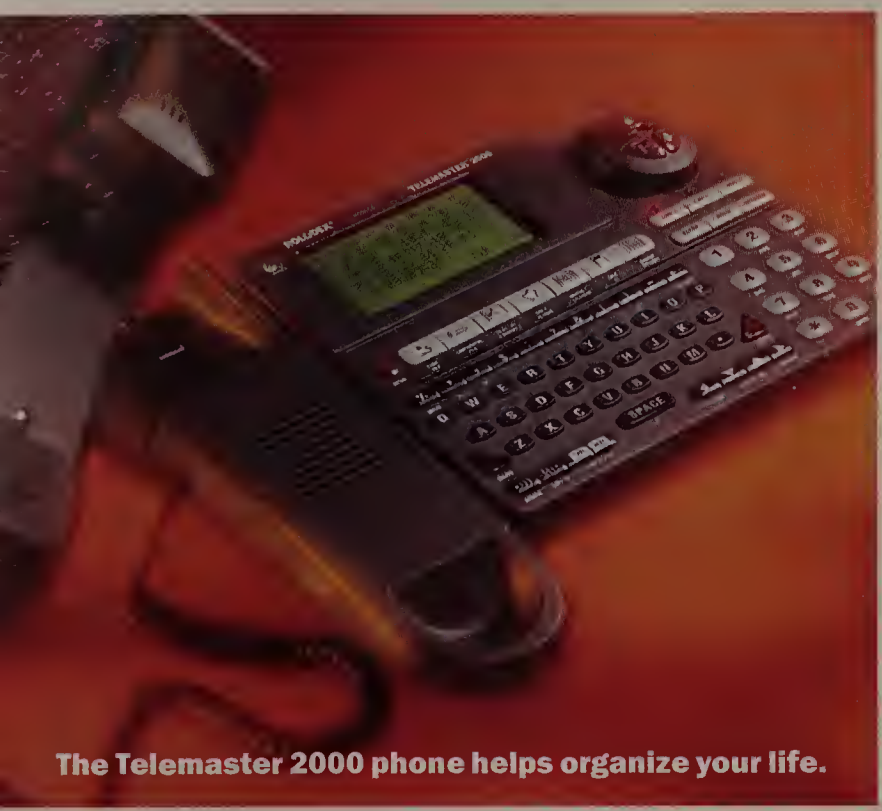

The Telemaster 2000 phone helps organize your life.

VALET IN A PHONE

My telephone has become my personal valet. No, it doesn't bring me tea or fetch my Batman suit, but it does wake me up, tell me my daily appointments, and prompt me throughout the day when it's time to get going. Rolodex's Telemaster 2000 stores up to 2000 contacts with phone numbers and addresses and will dial them at the touch of a button. But it's Telemaster's ability to share this information with my PC (and other Rolodex hand-held organizers) that has made me dependent. And with the optional $29.95 PC Link, a hardware-software combo, I can send names and phone numbers in ASCII format from my PC directly to the phone's memory, and vice versa. It's a clunky process, but it works. Appointments or to-do lists must be entered directly into the phone using the Telemaster's keypad. If you can stand all the setup, this is ultimately a convenient device. Now if I could only find a fax machine that would help me fight bad guys. —*Michael S. Lasky*

- **Telemaster 2000** $129.95 list; Rolodex; 800/727-7656. Grade: C+

  Reader service no. 699

PLAYING SPY

The leading Russian presidential candidate has been assassinated, and the president of the U. S. may be next. It's up to you, a top CIA operative in the post–Cold War era, to protect the chief executive and preserve peace. Spycraft is as close to the life of a spy as a game gets: Former CIA director William Colby, and Oleg Kalugin, former major general of the KGB, collaborated on this disc, giving it enough realism to satisfy any thrill-seeker. You'll track bullet trajectories, analyze satellite photos, encounter double agents, and discover nuclear weapon stockpiles—this is the stuff good paperbacks are made of. You'll be hooked from the start. Just don't blow your cover! —*Angela Freeman*

- **Spycraft: The Great Game** $49.95 list; Activision; 800/477-3650. Grade: A

  Reader service no. 700

ZOOMBINI LOGIC

It's not easy being a Zoombini. First they're run off Zoombini Isle by a clan of bossy Bloats. Then on the way to their new homeland, the wanderers are faced with the scariest hazards this side of Indiana Jones. Your task is to guide them to safety.

Kids 8 to 12 will enjoy selecting their own intrepid band of Zoombinis, whose mix and match features suggest a kinship to Mr. Potato Head. Don't be fooled by the game's whimsical feel, though—each of the 12 puzzles requires some sophisticated thinking skills, from logic to pattern recog-

PHOTO: BEVERLY HARPER; ICONS: JOHN HERSEY; ILLUSTRATIONS: TOP: MICHAEL JANG; RIGHT: BILL RUSSELL

paid for it to get it fixed. Upset, Lettaw faxed a letter to Canon pointing out that even a refurbished printer should last more than one year. Within 2 hours, he got a call from Canon. They offered to exchange his printer for another refurbished one, with no questions asked. Four days later the replacement printer arrived at his door, along with prepaid shipping for returning the old one.

Have a Seat

You probably already have an ergonomic workstation at the office, but what about the chair you sit in at home? Is it destroying your back? How about your neck? Your wrists? If you're ready to shop for an ergonomic chair but aren't sure what to look for, help is available. The New York Committee for Occupational Safety and Health has created a pamphlet called "Have a Seat." It tells you how to evaluate an ergonomic chair and even rates 25 commonly available models. The eight-page pamphlet costs $4.95 plus $1 postage and handling from NYCOSH (275 Seventh Avenue, 8th Floor, New York, NY 10001, 212/627-3900).

Homework Help

Want a night off from helping the kids do homework you barely understand? Check out the Online Tutor offered through Wow, CompuServe's new family-oriented online service (800/943-8969). Your kids can get homework help from the same tutors that help child stars like Macaulay Culkin. These certified teachers are ready to answer questions after school and on weekends, and they promise to get back to the kids within a reasonable time. There is no surcharge above the regular cost of Wow, which is $17.95 per month, with no hourly access charges.

By Christina Wood

TAKE NOTE: If you're interested in music, check out the Casbah (http://casbah.dmn.com). Search by artist or song title or just browse to turn up Internet links to the music you seek.

Featuring a unique compilation of royalty-free† music clips, Corel® Stock Music Library is the convenient and cost-effective way to add an interesting musical element to your multimedia presentations or product demonstrations. The library features music clips of three varying lengths to help you save on editing time. The ten CD-ROMs included offer 352 minutes of original melodies and encompass 21 different music categories. Ranging from corporate to classical, rhythm and blues to ambient and with 103 individual tunes to choose from, Corel® Stock Music Library offers music for every occasion.

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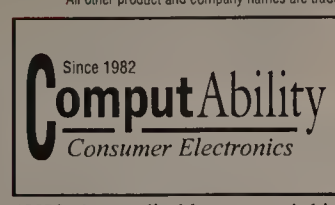

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nition to set theory. For example, at Pizza Pass you must determine which combination of pizza toppings will please the Tree Trolls. At the Hotel Dimensia, rooms are available to Zoombinis according to their physical features—you have to figure out who checks in where. Who knew math could be this much fun? —*Anne Kandra*

- **Logical Journey of the Zoombinis** $40 list; Broderbund Software; 800/521-6263, 415/382-4700. Grade: A

  Reader service no. 701

DESKTOP GARDENING

According to Martha Stewart, gardening is America's number one activity. If you're a member of this flourishing group, LandDesigner 3D is a valuable tool. Before you get your hands dirty, LandDesigner walks you through planning a garden: mapping out the landscape, preparing the soil, and compiling a shopping list with estimated costs. In addition, you can look up information on some 2000 plants—complete with photos from the White Flower Farms nursery catalog. Once you've laid out your landscape on screen (viewing in 3-D for a virtual walk-through), you can place your nursery order from the program, print, and start tilling. One caution: If you haven't used a design program before, give yourself time to learn. Then next spring, you can start smelling the flowers. —*Leslie Crawford*

- **LandDesigner 3D** $54.95 list; Sierra Online; 800/757-7707. Grade: A-

  Reader service no. 702

VIRTUAL COUNSELOR

What do you want to be when you grow up? I'm torn between writing and riding bucking broncos—despite the insistence of Career Counselor that it's impossible to have two different aspirations. This program asks questions about what you'd like to do, then gives you a list of jobs. I said I wanted to write, edit, *direct movies*, and be a rodeo clown. The program doubted my sincerity. Fine, I deselected direct movies. Career Counselor told me I could be a manager of blue-collar workers, a mathematician, a secretary, or a writer/editor. Um...yeah...I see a common thread there. And that list is based on what I *want*, not my aptitude. Then the program calculated earning potential and presented interviews with people who do those jobs. If you have a teenager who's trying to figure out what's out there, let them browse. But don't expect "career counseling." This is just a picture book of jobs. —*Yael Li-Ron*

- **Kaplan's Career Counselor** $39.95 street; Kaplan Interactive; 800/527-4836, 212/752-1840. Grade: C

  Reader service no. 703

Gearheads' cute toys will have you hooked.

WAR OF THE TOYS

Forget educational value. Forget exploring an alternate universe. Fire up Gearheads for obsessive, mindless fun. The game's object is to pit your players against your opponent's to score points. You get a toy box of wind-up players, each silly and beautifully rendered: Ziggy the cockroach is fast and agile; Kangruffian, the pugilist kangaroo, delivers a fast right hook. All you do is aim your army and fire them at enemy lines. Once the toys hit the game board, they'll do as they please—score a point for you, die, or score a point for the enemy. This game won't entertain for hours, but you may find the impulse to play a quick one becomes an obsession. —*Christina Wood*

- **Gearheads** $39.95 list; Philips Media Games; 310/444-6609. Grade: B

  Reader service no. 704

GET SMART

Kids may play games to have fun, but competitive adults want to prove they're smarter than their friends. Smart Games Challenge #1 lets you demonstrate your genius. This collection of 20 games includes the usual brainbenders—anagrams, cryptograms, picture puzzles—plus a few unique challenges. In Native Tongue you master a fictional language, while Car Jam tests your valet parking skills. Once you've completed each puzzle you can post your score to a Web site (http://www.smartgames.com) and become eligible for cash prizes. The games are challenging and occasionally addictive, but the disc's obtuse instructions, bland visuals, and cheesy soundtrack keep its IQ in the double digits. —*Daniel Tynan*

- **Smart Games Challenge #1** $29.95 list; RandomSoft; 800/788-8815. Grade: C+

  Reader service no. 705

BUZZ AND WOODY, TAKE 2

I'm often as much a kid as my kids. So I was excited to get Toy Story, Disney's latest animated CD-ROM storybook. It didn't disappoint. The animation is terrific, and the jokes are funny on multiple levels—something for the kids and something for the over-18 crowd. Every screen is chock-full of animation; some scenes are predictable, but others—such as Buzz and Woody coming to blows at the gas station—are surprisingly funny. Besides the four structured games, there are several activities—like helping the toys get out of Sid's room or helping Woody knock Buzz out the window. As with most storybook discs, older kids will tire of the activities, but it's a safe bet that the six-and-under set will keep coming back for more. —*Roberta Furger*

- **Disney Animated Storybook, Toy Story** $35 street; Disney Interactive; 800/900-9234, 818/543-4300. Grade: B+

  Reader service no. 706

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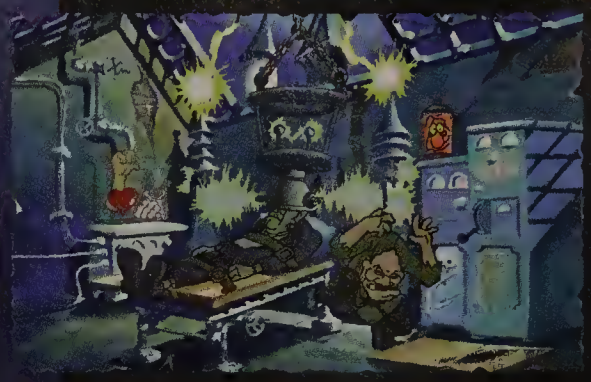

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Compaq and Micron Slash System Prices

Price wars continue: You get more for your money.

BY KIRK STEERS

Dell's Dimension P-100t grabbed the number one slot this month by offering a sweet combination of performance and price. And Micron—in response to big price cuts from Compaq—managed to cling to the number two slot by trimming close to $400 off the price of its Home MPC Pro.

Dell's Dimension P-100t is the machine of choice for a tight budget. It combines a very palatable $2099 price tag with solid service and reliability. And even though it's no P-166, in our testing, this P-100 machine outperformed many systems with meatier CPUs. It's not heavily laden with fancy extras—there's no family entertainment software or friendly interface—but it does have Microsoft Office 95 Professional.

Micron's Home MPC Pro is still the fastest home system we've tested and comes with a 17-inch monitor and an Iomega Zip drive. With the recent $351 drop in price, you certainly get your money's worth. This isn't the easiest machine to assemble and use, however: It has lots of components and no user interface for novices. It comes with Microsoft Office instead of an integrated package like Microsoft Works. Micron sells only through mail order.

Compaq's Presario 9240 ranked number four last month, but with a $300 price cut it inched up the chart to number three. This reasonably fast 133-MHz machine boasts our favorite feature: a PD-CD-ROM drive that looks like your average unit but is both a 4X CD-ROM drive and a rewritable optical drive. Once you're done playing Myst, pop in a special disc and copy up to 650MB to it. (Extra discs sell for around $40 apiece.) **Compaq's Presario 9234**, though merely a 120-MHz model, is also a great buy. Its low price, excellent reliability, and solid performance make it a good family choice.

HP's Pavilion 7130P is a stylish machine with a curvy sports-car look from a company with a stellar reputation for reliability. It's a snap to set up, and the custom interface guides novices around the system. Best of all, the built-in, snapshot-size color scanner and EasyPhoto software will have you building a digital photo album in seconds. The preproduction unit we tested is probably slower than the version you'll find on store shelves.

One notable system that didn't make the chart: the new Acer Aspire P-166 minitower. The Aspire's charcoal gray case would look stylish in your living room, and the system's thoughtful design earned it the highest ease-of-setup rating we've seen yet. But its unexceptional performance, and the company's lackluster service and reliability scores, kept the Acer Aspire out of the running.

Kirk Steers is a PC World *contributing editor.*

TOP 5 HOME PCs

	Price	Overall rating	Reliability/service rating	PC WorldBench score	Setup rating	Multimedia compatibility	Extra-value points	CPU	RAM (MB)	Hard drive (GB)	CD-ROM drive	Reader service number
1 Dell Dimension P-100t 800/613-3355	$2099	75	77/77	150	58	95	1 [1]	P-100	16	1	6X	803
2 Micron Home MPC Pro 800/223-6571	$3197	74	76/69	194	73	95	7 [2]	P-166	16	1.2	6X	804
3 Compaq Presario 9240 800/345-1518	$2998	74	76/71	147	78	100	6 [3]	P-133	16	1.2	4X	805
4 Compaq Presario 9234 800/345-1518	$2498	73	76/71	129	78	100	1 [4]	P-120	16	1.6	4X	806
5 Hewlett Packard Pavilion 7130P 800/724-6631	$3098	72	78/66	126 [5]	88	100	6 [6]	P-133	16	1.6	6X	807

Test systems include a 15-inch monitor and a 28.8-kbps modem, unless otherwise noted.

For more information about all products in this article, circle reader service no. 915.

BEST BUY

[1] Microsoft Office Professional.
[2] 17-inch monitor, Iomega Zip drive, Microsoft Office.
[3] Answering machine, rewritable PD-CD-ROM drive.
[4] Answering machine.
[5] We tested a prototype; shipping unit may be faster.
[6] Answering machine, built-in color scanner, image editing software.

Methodology The overall rating includes ratings for reliability and service (30 percent), price (20 percent), PC WorldBench test results (20 percent), setup (10 percent), multimedia compatibility (10 percent), and extra-value items (10 percent). Reliability and service ratings are based on results of PC World's Reliability and Service Monitor survey. For a description of the PC WorldBench 1.0 tests, see the Test Report in this month's system review. We gave up to 100 points for ease of setup, clarity of documentation, and quality of user interface. To derive the multimedia compatibility scores, we evaluated the installation and use of five popular multimedia titles and six applications for a maximum score of 100. Extra-value points are given for hardware and software that set a machine apart from the competition.

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- Child Care Family Handbook
- Everyone's Guide to Cancer Therapy
- Headaches
- Infertility
- Mobility Aids
- Multiple Sclerosis
- Pediatric Renal Anomalies
- Sleep Disorders
- Stroke
- The Amputee
- The Immune System

Circle 76 on reader service card

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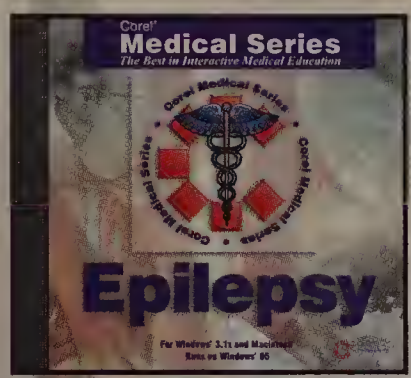
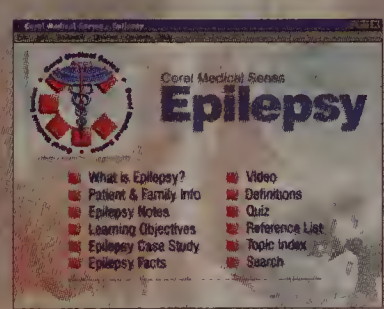
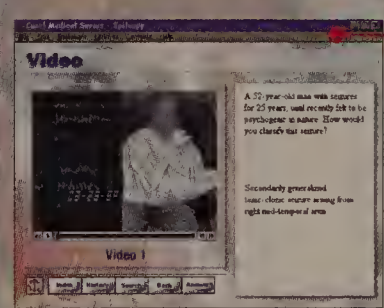


$24.98*

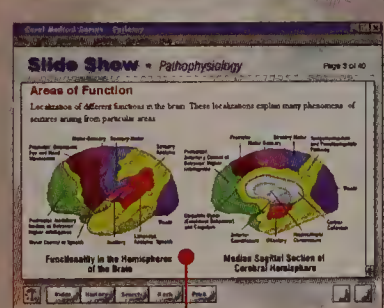
Written by a neurologist with a special interest in the field of epilepsy:
A. Guberman M.D., F.R.C.P. (C).
Professor of Neurology, University of Ottawa

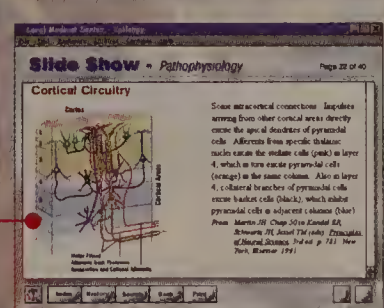
The first title in the Corel® Medical Series covers the topic of epilepsy from various perspectives, including pathophysiology, epidemiology, diagnosis and treatment, in a comprehensive, problem-based interactive format. This multimedia title provides a wealth of up-to-date information on this rapidly expanding area of medical research and offers in-depth analysis of all aspects of epilepsy. This indispensable CD-ROM is an invaluable resource for medical students, physicians, neurology and psychiatry residents, nurses and especially patients and their families.



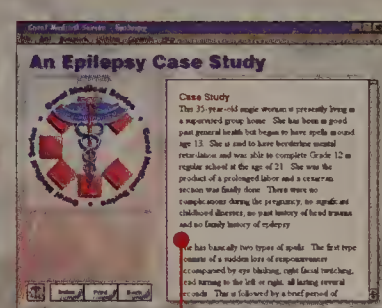


Videos
Set up as an audio-visual exercise to examine various types of seizures.





Slide Show
Includes a search feature, allowing self-navigation through all text and images.



Case Study
The real-life case study provides an overview of the typical problems associated with epilepsy.

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When My Backup Crashed

How I survived a hard disk crash and a lemon of a backup.

BY STEVE BASS

The noise was loud. At first, I thought someone had taken a chain saw to my tree. Then panic set in—I don't *have* a tree. It was my hard disk suffering its final death throes. But I was in for an even worse surprise: My backup was totally useless. Believe me, you don't want to go through what I did these past few weeks. Listen to my story, and heed my warnings.

At first, I thought I was in pretty good shape for someone with a dead drive. I was fully backed up, and I even had a new hard disk in the closet. But when I started to restore my programs and data with Conner's Backup Exec software, the tape stalled halfway through. I rebooted and tried again. The system froze. With heart in hand, I went to my second tape. 'File Not Readable' flashed on the screen. I tried everything from booting with a plain-vanilla floppy disk, to sending my tapes to Conner tech support, to spinning on one leg while whistling an off-Broadway tune. Nothing doing.

I won't bore you with all the gory details, but I finally concluded that my tape drive, a Conner 3200 Internal SCSI, is a lemon—and one so cunningly sour it fooled my software into telling me it was sweet. Just to be sure, I did a full backup on yet another new tape. The compare routine said everything was fine. But the restore failed, with unreadable files.

Sure I'm angry. Hey, I'm the guy who's been telling *PC World* readers to back up their hard disks for years. And I've followed my own advice religiously. But when the bits hit the fan, I discovered that my tape drive had been messing things up without even telling me.

PASS THE PLATTERS

My last shred of optimism was pinned on the one company I'd hoped I would never need: Ontrack Data Recovery. Ontrack takes expired hard drives and attempts to recover the data. That's a great service, and they'll respond—and work on your drive—24 hours, seven days a week. But I felt my stomach churn at their fees. Diagnosis is $200, and the recovery charge ranges from $300 to $1800 (there's no charge if they can't recover the data). Obviously, this is not something that you would do for a drive full of games, but if vital data is at stake, the price is worth it.

I was impressed with Ontrack's efficiency. Within just 4 hours of my call, a perky courier (well sure, it wasn't his data) picked up the drive. They called with a progress report daily until, on the third day, they had a final analysis: The data was unsalvageable.

I had no choice but to spend five long and torturous days reinstalling programs, tweaking configurations, and (worst of all) reentering data. All the while grumbling and planning new backup strategies. (The Conner tape drive is now a doorstop, a job it shares with my old hard disk.)

BACK UP THE BACKUP

So how can you protect yourself against similar catastrophes? The ideal solution would be to restore your entire backup to another hard disk every once in awhile, just to make sure you can. If that's not practical, back everything to tape, and then make additional copies of important data files on floppies. Yep, it's time-consuming, but hey, I'm still reconstructing a database.

The experience was unnerving, but there was a silver lining. I was able to clear away megabytes of deadwood programs I rarely use and some I didn't even remember I had, giving me the opportunity to upgrade to Windows 95 with a clean slate. And to find another tape drive. Stay tuned.

- **Ontrack Data Recovery** fees vary; 800/872-2599, 612/937-5161, 612/937-5750 (fax)
  Reader service no. 672

Contributing Editor Steve Bass is a licensed marriage and family therapist and the president of the Pasadena IBM Users Group. He can be reached on PC World Online (see page 14 for more information).

TALK TO US: You can e-mail the editors of the PC World @Home section at home@pcworld.com, and write to us at 501 Second St. #600, San Francisco, CA 94107. We're eager to hear your responses and opinions about any topic related to home computing.

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[illegible] P100SD

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- PCI Bus with 128-bit Graphics Accelerator
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